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SUGAR BEET

BULLETIN

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		SPRECKELS SUGAR BEET BULLETIN	
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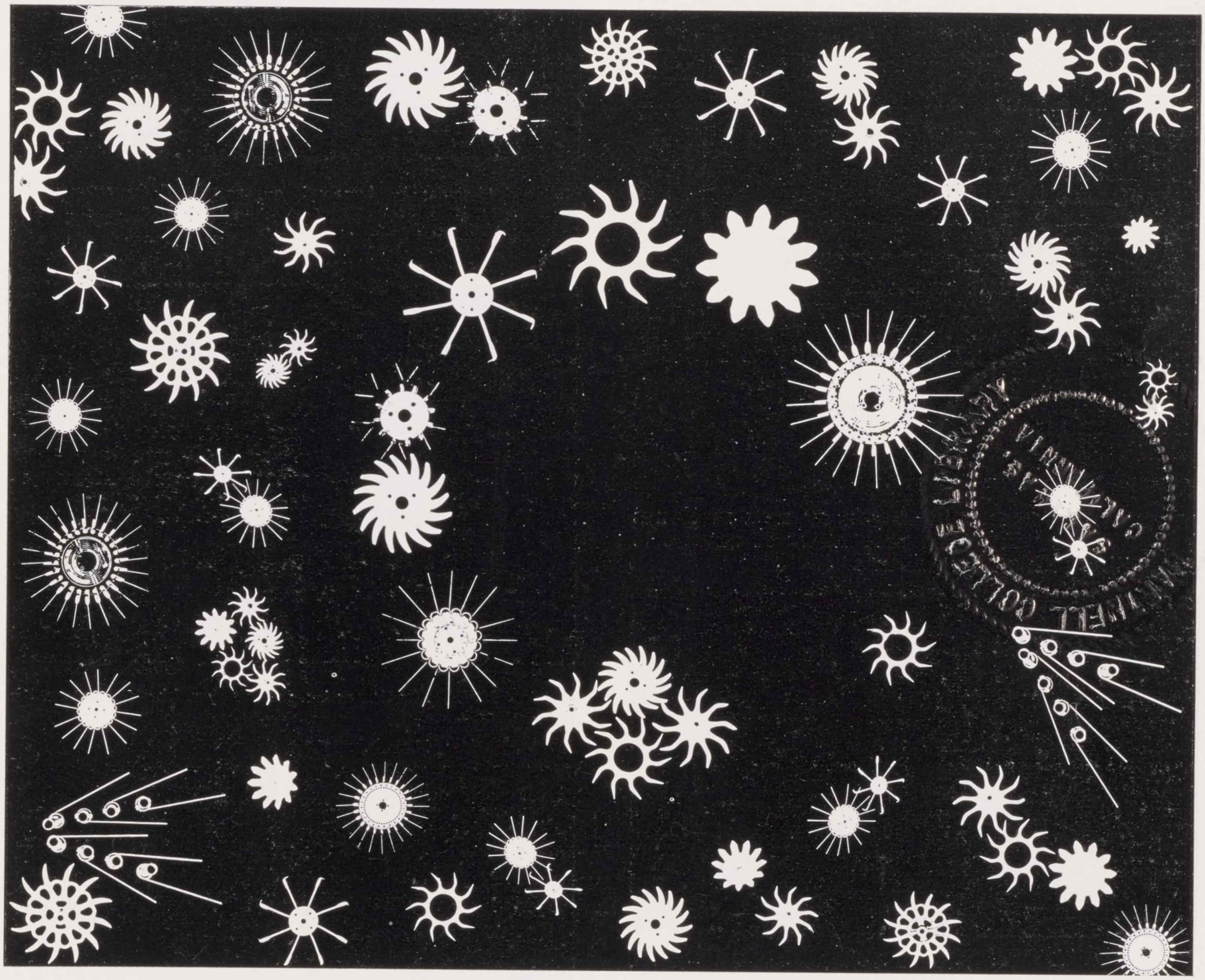
PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

SPRECKELS SUGAR BEET BULLETIN

VOL. 29 JANUARY-FEBRUARY, 1965 NO. 1



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CULTIVATION CONSTELLATION

Tools and methods for weed control and stand reduction in the sugar beet field are not as numerous as the stars, but there are enough to give a bewildering choice to the beet grower.

This issue is dedicated to the subject of available systems of weed and stand control.

THERE IS NO CURE-ALL FOR WEEDS

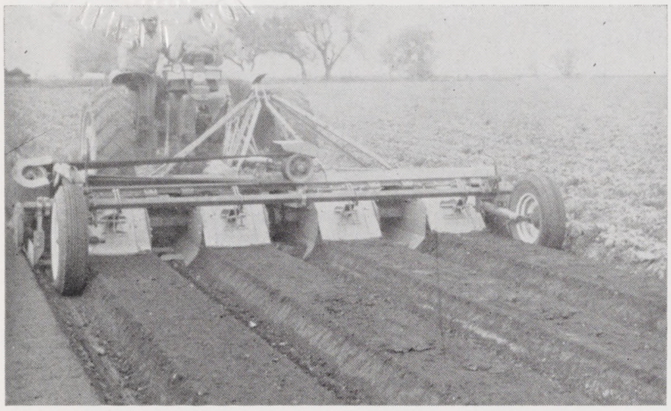
By AUSTIN ARMER,
Agriculture Engineer
Spreckels Sugar Company

TIME WAS when the pursuasive hard-sell brought snake oil to our grandfathers' medicine chests, with promises of instant relief of every ailment from corns to consumption. But in the sophisticated present, we all know that each ailment has, at best, only one specific remedy, and that matching the cure to the ill is why we visit the doctor.

When it comes to matching a weed-threatened sugar beet field to its most specific remedy, the grower is the doctor. While his farm advisor and his fieldman are his consultants, the grower must rely upon his intimate knowledge of his own field, with its complex environment of soil, weather, water and weeds.

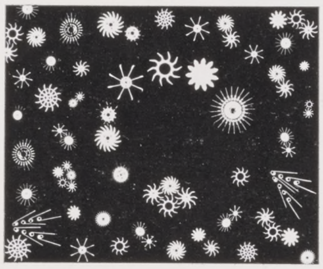
This issue of SPRECKELS SUGAR BEET BULLETIN is devoted to weed control, and there are some meaty articles and Fieldmens' Notes which go into considerable detail on the specifics of weed control — mechanical, chemical and the fast disappearing hoe.

Past issues have described a host of machines and methods for weed control. A few of the more recent tools and machines are mentioned herewith. But above all, we urge each grower to analyze his particular weed situation; to study his past successes and failures, and to employ new machines or methods only as their probability of success is compatible with past experience.



Northwest Photo 2

THE NORTHWEST Rotary Tiller is shown in the rear view above. Thorough pulverization, coupled with flat-topped, sharp-shouldered beds suggests that pre-emergence herbicide incorporation would be successful. (Northwest Equipment Company, P.O. Box 73, Yakima, Washington.)



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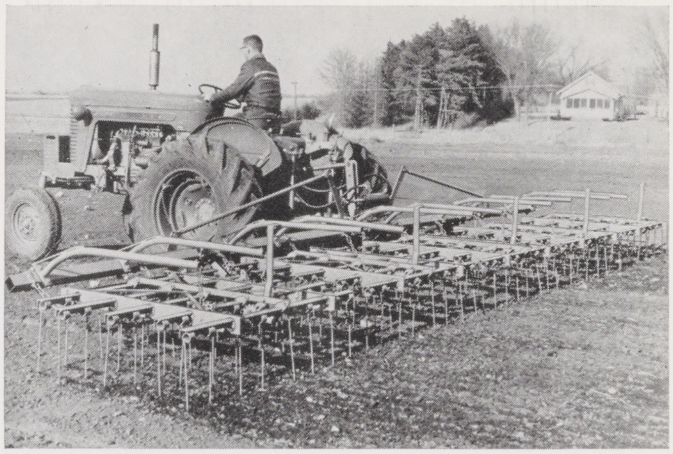
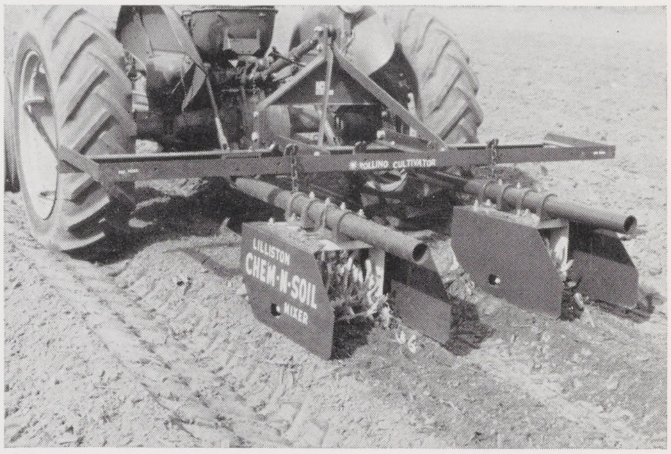
COVER COMMENT — The rotary cultivating and thinning tools in this galaxy are only nine of the many available, and were kindly loaned by Middleton Implement Company of Woodland.

Some black velvet, a Rolleiflex, a Leica, scissors and paste completed the picture.



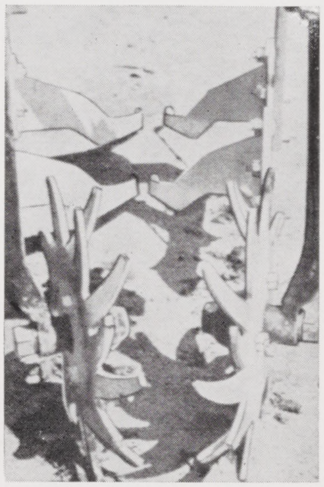
Noble Photo 4

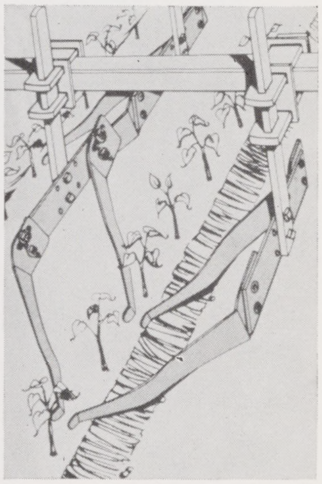
NEW NOBLE Spring-tine harrow is an example of the many finger-weeder types of tools. These are very effective in mechanical stand reduction and weed control.



Lilliston Photo 5

CHEM-N-SOIL Mixer by Lilliston is a satisfactory mulcher and incorporator in friable soils.





Bezzerides Photos 6 7

BEZZERIDES "Spyder" wheels (left), followed by leaf-spring weeders (right), are particularly effective in destroying late-emerging weeds in sugar beets. (Now manufactured and distributed by S. L. Allen, manufacturers of Planet Jr. Tools)

CONTROL OF LATE EMERGING WEEDS CAN BE PROFITABLE

By LAUREN M. BURTCH, *Chief Agronomist*
Spreckels Sugar Company

WE ALL realize the necessity and importance of controlling weeds that emerge with beets, but we tend to ignore the problem of weeds that emerge after thinning. There have been several good reasons for this. First, hand hoeing labor is expensive and often unavailable. Second, growers are reluctant to knock in ditches and delay irrigation schedules long enough to permit cultivation equipment to work. Third, our early plantings often produce good yields in spite of some fairly heavy grass competition at harvest.

There is the other side of the coin, however. How much reduction in yield resulting from late grass competition can we afford? The loss in yield, the build up of weed seeds, and extra harvest expense might well encourage us to take a second look at late season weed control.

Several experiments have been conducted in recent years in several central valley growing areas comparing yields from hand hoeing of watergrass with the field practice of not controlling the grass. These tests included post emergence chemical or mechanical treatments as well as hoeing, but only the hoeing treatments were effective. The effect of hand grass control on yield is illustrated for both early and late planted beets in the following table:

TABLE 1:

A COMPARISON OF THE INFLUENCE OF GRASS COMPETITION AT HARVEST ON YIELDS FROM EARLY AND LATE PLANTED SUGAR BEETS

EARLY PLANTED

Location		Yield T/A	Grass Cover[1]	Labor Hrs./Acre
Firebaugh	Hoeing	28.4*	12*	50
2/57	Fld. Prac.	16.3	80	0
Yuba City	Hoeing	26.2*	10*	12
3/57	Fld. Prac.	19.9	60	0
Mendota	Hoeing	26.3*	7*	20
3/64	Fld. Prac.	22.7	45	0
MEAN YIELD LOSS		7.3		
MEAN VISUAL IMPROVEMENT			52	
MEAN LABOR REQUIRED HRS./AC.				27

LATE PLANTED

Location		Yield T/A	Grass Cover[1]	Labor Hrs./Acre
Tracy	Hoeing	19.3	5*	7
5/57	Fld. Prac.	17.4	25	0
Davis	Hoeing	17.6*	5*	78
5/58	Fld. Prac.	3.2	95	0
Mendota	Hoeing	16.6*	5*	50
5/64	Fld. Prac.	5.8	95	0
MEAN YIELD LOSS		9.0		
MEAN VISUAL IMPROVEMENT			67	
MEAN LABOR REQUIRED HRS/AC.				45

[1] Grass Cover refers to visual estimate or % of beet foliage obscured by grass at harvest.

*Denotes Statistical Significance at the 5% Level.

It is clear from the data that grass control by hand labor can result in a significant (though expensive) improvement in yield. It is further apparent that yields from late plantings are more seriously reduced by grass competition than are yields from early plantings. Satisfactory yields are often obtained from *early* plantings in spite of a severe grass problem at harvest. In contrast, severe grass competition at harvest *never* results in a satisfactory yield with *late* plantings.

In 5 of the 6 situations, hand hoeing raised the yield by a range of from 3.6 to 14.4 tons per acre. In the one exception, the grass infestation was light and hence did not provide serious competition for the beets.

It is also evident that while grass control improves yields, this improvement is often costly. Note that 3 of the 6 tests required from 50 to 78 hours per acre to keep the beets seasonably free of grass.

MECHANICAL AND CHEMICAL WEED CONTROL

New mechanical and chemical approaches which could either replace or reduce the amount of hand hoeing have recently become available. Two trials comparing the effectiveness of six chemical and mechanical treatments were conducted at the new Spreckels farm near Mendota in 1964. The trials were planted in March and May to represent typical Central California planting periods. Three pre-emergence chemical treatments, Tillam at 4 pounds per acre, Pyramin at 4 pounds per acre and a mixture of 2 pounds of each chemical, were compared with two post-emergence pre-thinning mechanical treatments and a check. All chemicals were applied with a B W rotary incorporator sled and mixed in an 8 inch band of soil to a depth of approximately 3 inches on 30 inch beds. The incorporator was used on all plots whether chemically treated or not to standardize conditions. Mechanical weed control treatments were accomplished with the Silver Tine Weeder and Thinner used from two to four times, depending on the population of weeds and beets. Each experiment was replicated six times with plots 100 feet long and 8 rows wide.

A heavy stand of grasses emerged with beets at both planting dates. Very few broad leaf weeds were present, but watergrass and oat emergence was heavy. Very good control of grass was obtained from Tillam, the mixture of Tillam and Pyramin, and both Silver Tine Weeder treatments with the March planting. Pyramin, which is primarily effective against broad leaf weeds, provided slight but insufficient grass control.

Only Tillam provided effective practical grass control with the May planting, largely because of the extremely heavy stand of watergrass.

Pre-thinning beet counts were significantly reduced only by the mechanical treatments. Post-thinning counts reflected this reduction, and resulted in less uniform down-the-row beet population after thinning for the mechanical treatments. This influence was visually apparent for both planting dates, and statistically significant over the check for

the March planting.

Hand labor comparisons are listed in Table 2.

TABLE 2:

THE INFLUENCE OF PRE-EMERGENCE CHEMICAL AND POST EMERGENCE MECHANICAL TREATMENT ON LABOR COSTS FOR EARLY (MARCH) AND LATE (MAY) PLANTED SUGAR BEETS. (MENDOTA, CALIFORNIA, 1964)

Treatment		Thinning Labor Hrs/Ac		Hoeing Labor Hrs/Ac		Total Labor Hrs/Ac	
PRE	POST	Early	Late	Early	Late	Early	Late
None	No Hand Work	31.3	73	None	None	31.3	73
Tillam 4 lbs./ac	Hand Once	20.6	46	17.5	38	38.1	84
Pyramin 4 lbs./ac	Hand Once	25.6	42	Mech. 1	Mech. 2	25.6	42
Mixture, (2#+2#)	Hand Once	21.9	44	13.9	36	35.8	80
Mech.	Hand Once	17.0	41	15.5	40	32.5	81
Mech.	Hand Twice	17.6	----	19.9	----	37.7	----
MEAN		22.4	49	16.7	38	33.3	72
L.S.D. 5%	Level	6.4	13	----	----	NS	20

The data in Table 2 show the pre-thinning treatment influences to be reflected in reductions in thinning labor. These differences are statistically significant for all treatments with the May planting, and for all treatments except Pyramin with the March planting. The Pyramin treatment approached significance in March, however.

Approximately twice as much time was required for thinning the May planting as the March planting, largely because of the severe grass problem encountered with the May planting.

Both plots were carried through the normal summer growing season and were harvested on November 6. Control of summer weeds, mainly watergrass, was attempted with mechanical tools as well as with hand hoeing. Four of the March and three of the May treatments were cultivated periodically with standard cultivation equipment and supplemented with hand hoeing. One treatment at each planting date received only standard cultivation, supplemented with mechanical weeding equipment developed by the Bezzerides Brothers of Orosi, California. (See cuts No's. 6 and 7, page 2)

The summer hoeing treatments listed in Table 2 show rather clearly that late season weed control was not achieved with *any* pre-emergence chemical treatment. This would be an indication of both breakdown of the material with time, and perhaps from disturbing the treated area with hand hoeing or cultivation operations. The data again show that summer weed control was more difficult and costly for the May planting.

The final columns in Table 2 list the total amount of hand labor required for each treatment. It is interesting to note that the check treatment with only one hand operation (thinning) was in the same cost classification as the treatments receiving 2 or even 3 hand labor operations. Conversely, the treatment receiving only late season mechanical control was considerably cheaper in total labor requirements.

DIFFERENT METHODS COMPARED

The data in Table 3 (early-planted beets) show Tillam, the mixture of Tillam and Pyramin and Pyramin followed by the Bezzerides weeding equipment all to be equal in gross sugar production and root yield. However, the pre-thinning mechanical treatments followed by two hoeings, and the check were both significantly lower in gross sugar and root yield. The second pre-thinning mechanical treatment equalled the mean for the experiment. Sucrose percentage values were not significantly different for any treatment. Although slight differences were visually apparent between the main treatments at harvest, only the check showed a significant increase in visual grass cover.

TABLE 3

A COMPARISON OF THE INFLUENCE OF SEVERAL WEED CONTROL TREATMENTS OF SUGAR BEET YIELDS NEAR MENDOTA, CALIFORNIA

Planted March, 1964 — Harvested November, 1964

Treatment		Sugar	Yield	Sucrose	*Grass
Early	Late	T/A	T/A	%	Cover, %
None	None	3.34	22.7	14.7	47
Tillam, 4#	Hand Once	3.87	26.3	14.7	7
Pyramin, 4#	Mech. 3 Times	3.91	26.4	14.8	15
Mixture, (2#+2#)	Hand Once	3.82	26.0	14.7	4
Mechanical	Hand Once	3.57	24.8	14.4	13
Mechanical	Hand Twice	3.19	22.6	14.1	7
MEAN		3.62	24.8	14.6	16
L.S.D. (.05)		0.45	2.5	N.S.	18

*Grass Cover in % of Beet Foliage Obscured.

SOME CONCLUSIONS

In summary, mid season weed problems have in general received the least attention from sugar beet growers and weed specialists. This has been partially attributable to not having the necessary chemical or mechanical means for doing the job. It has also appeared that both growers and fieldmen failed to fully appreciate the harmful influence of weed competition on yield, and that they failed to detect weed problems in time to take effective action.

Our experiments have shown that the fight can be worth the effort, and that effective mechanical tools are available for use from emergence through the harvest. Moreover, mechanical in-row weeders might prove beneficial for the incorporation of promising chemicals after thinning for summer weed control.

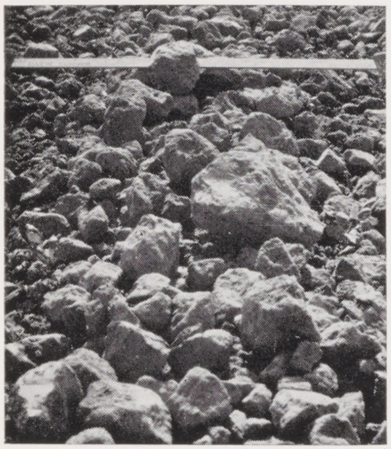
The presently available pre-emergence chemicals seem best adapted for late plantings, where heavy weed populations emerge with the beets. Pre-emergence chemicals have generally been less successful when used on early planted beets, since rainfall, temperature, salt or short residual may have limited their effectiveness.

For the present, we need to take full advantage of available chemicals *and* mechanical tools, using the advantages of one to bolster the weaknesses of the other.

"WHY DOESN'T TILLAM® WORK EVERY TIME?"

By N. F. HARDMAN
Stauffer Chemical Company

THERE ARE SEVERAL reasons why Tillam 'does not work every time'. Each one of these reasons can be managed, and generally eliminated. Factors which influence the weed-killing effectiveness are here listed and discussed.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NOT SUITABLE for best results from Tillam is this windrow of clods (an actual photograph of a seedbed which produced some beets along with a fine crop of weeds).

SOIL. We have yet to find a soil type where Tillam, timed properly, applied and incorporated adequately would not control the weeds listed on the label. Soil of all types, prepared so as to bury trash and to give good tilth before application - incorporation, will result in good control if all instructions are fully observed. (The seed bed illustrated is an example of something less than "good tilth").

MOISTURE. As long as soils are dry enough to not stick to tools, and can be thoroughly worked by disc or band incorporation, soil moisture at the time of application-incorporation is not important.

Application before heavy pre-irrigation is to be avoided, because a small amount of movement downward from the surface results in poor control.

TEMPERATURE. This factor is important in relation to timing, only because weeds will germinate when temperatures are favorable for them.

TIMING. When weeds are germinating, Tillam will control those listed on the label. In other words, do not use Tillam if the weeds to be controlled are not germinating.

LONGEVITY. Tillam in moist soil is slowly broken down by biological action, so that one-half is destroyed in 30 to 40 days. Tillam applied in advance of weed germination may, therefore, not be in full strength to give control. The more resistant broadleaves, such as lambsquarter and pigweed, must have *at least* 4 lbs. per acre *at the time they germinate* to give control.

RATES. Tillam is registered up to 6 lbs. per acre. We have recommended 4 to 5 lbs. per acre. When using a disc, 4 lbs. is quite adequate. Where band application is used, 5 lbs. per *treated* acre is recommended on all soils except those which are very sandy or highly organic. Highly organic soils require higher rates, as with other chemicals. Very sandy soils with no colloidal constituents to partially adsorb Tillam give weeds maximum opportunity for absorption of Tillam and, therefore, 4 lbs. per acre is adequate.

INJURY. When beets are allowed to suffer for lack of sufficient moisture, they will react to Tillam by the leaves sticking together and curling. Fortunately, this will be quickly outgrown if proper irrigation is supplied. Sandy soils are a problem in relation to moisture retention; consequently injury is often encountered.

APPLICATION-INCORPORATION. 90% of the unsatisfactory results of Tillam are a result of improper application-incorporation. The other 10% are related to the above listed factors. In other words, it is not the Tillam that fails, but rather the fact that it is misused.

Because Tillam is pulled off the soil by evaporating moisture, Tillam must be incorporated immediately after application.

Band incorporators, although attractive to use, are complicated. Unless all precautions are continually watched, poor control or no control may result. A few rules of application are here listed:

1. Beds must be of uniform height, level and flat topped. Spraying on peaked beds results in uneven distribution of chemicals after rotary tilling. Bed shapers on the incorporator must be full of soil at all times to make a bed of sufficiently uniform height.
2. Soil must not be too wet, otherwise it will stick (along with most of the tillam) on the underside of the incorporator hoods.
3. Blades must be checked frequently for wear. Blades should be kept at least 4" long. In a very heavy soil, better results are obtained with 5" to 6" long blades.
4. Spray nozzle must be located *after* the bed shaper—not in front.
5. Soil loss from the bed top at the time of rotary incorporation, and from the rear of the machine because of inadequate shielding, must be avoided. Some light soils hit the rear roller and literally flow off the bed. Weed control by Tillam lost into the furrows is of little value to the farmer.
6. Planting should be done without a clod pusher or blade in front of the planter. Otherwise, treated soil is again lost into the furrows.
7. Avoid using shovels in back of the planter. Untreated soil placed on top of treated soil results in no control.
8. Too great forward speed of the tractor versus the rotary speed will result in poor incorporation. A simple test of adequacy of incorporation is to put barley, beet seed or sawdust on beds in front of the tiller; then to examine the distribution in the soil for uniformity after incorporation.

DISC-INCORPORATION is far more simple and has given better control especially in very heavy soils. Weeds cannot grow out of the deeply treated soil as easily as in the limited depth of a band.

1. Application-incorporation with a disc to incorporate Tillam should be at as high speed as possible (preferably 4 mph or more), the soil having

®—Trademark Registered, Stauffer Chemical Company been previously worked to good tilth.

2. Ideally, the spray nozzle should be on front of the disc so that incorporation is immediate. Double discing the same day as the first discing in most soils is important. Right angle discing to the first is best, but discing back down the swath has given good results.

3. Avoid using listers at a depth that will bring up untreated soil and place it on top of the beds. Simple V-shaped bed-crowders move the treated, loose soil into beds without this hazard.

4. Plant immediately, as in band treatment. Sugar beets exhibit true physiological tolerance to Tillam when properly used and when growing under good conditions.

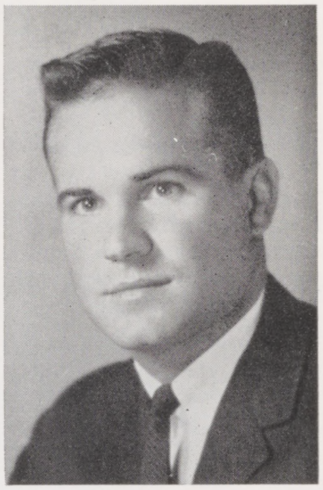
COST. To those who say that 4 lbs. per solid acre is too costly, we say, "How much is weed control worth?" Always leave an untreated strip; How else will you know if you have gained or lost?

MELVIN VOOS TO ASSIST KENDRICK

MELVIN H. VOOS, formerly Field Superintendent in District 3 at Woodland, has been appointed to the post of Assistant to the Agricultural Manager, with headquraters at 2 Pine St., San Francisco.

John Kendrick became Agricultural Manager on August 31, 1964, succeeding Hugh F. Melvin upon his retirement.

Mr. Voos' field experience will contribute to close liason between Central and District administrations.



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SPRECKELS AGRICULTURAL STAFF MEETS AT ANNUAL CONFERENCE

FOUR DAYS of meetings were attended by the 55 members of the Spreckels Agricultural Department at Del Webb's Towne House, Fresno during the week of January 25.

In keeping with custom, sessions were devoted to talks by invited speakers; talks and panels on agricultural research and development, and presentations by members of the Company's management.

Research and development discussions covered fertility studies, varietal performance, Arizona trial plots, weed control, beet receiving facilities and significance of clean beets.

District 1—Spreckels San Francisco District 2—Manteca

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District 3—Woodland District 4—Mendota

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All 55 members of the Spreckels Sugar Company Agricultural Staff gathered at their annual meeting at Fresno, January 26-29.

1964 CROP REPORT

By J. M. KENDRICK, *Agricultural Manager*
Spreckels Sugar Company

WITH A SUBSTANTIAL acreage remaining to be harvested, it may be premature to discuss the 1964 crop. However, the crop statistics to date imply that a good crop is in prospect and nothing can be seen at this time which arouses a pessimistic viewpoint for the portion of the crop yet to be processed.

Generally, the fall harvest (July 1964 through December 1964) progressed well. It would have been expecting too much to have had an uninterrupted harvest for the entire 6 months. If this good fortune could have prevailed far fewer unharvested acres would now exist. It is estimated that approximately 10,000 additional acres could have been processed had the rains of late October, mid November and December not occurred. Despite these weather interventions the factories were operated any time a beet supply was available and nearly 2.5 million tons were processed.

The coastal area, which is essentially completed, has produced a yield of nearly 27 tons per acre at over 15% sugar. While this production falls just under last year's crop it stands second high since the record crop of 1959. On the average, each acre of sugar beets in this area produced nearly 8,150 pounds of sugar.

The Manteca area, where a sizeable portion of the crop remains unharvested, is experiencing the highest sugar content since 1959 and a yield which appears likely to equal that of last year when all the returns are in. On the basis of sugar per acre produced, the 1964 crop will very likely exceed all years since 1959.

The Woodland area, where the highest percentage of overwintered beets is located, is difficult to predict; however, results to date with a quarter of the crop harvested, show sugar content at its highest since 1959 and tonnage slightly above last year's crop at this time.

The Mendota District is nearing harvest completion and statistically is behind the other districts when the 1964 crop is compared with the 1963 crop. Although 1964 may fall a little short of 1963 in the South San Joaquin area it appears to be equal to or to exceed all other crops of the period 1960-62. It might be interesting to note that in this area the 1963 crop was a record and surpassed the bumper 1959 crop by a fairly wide margin. On this basis, the 1964 crop ranks well above the five year average.

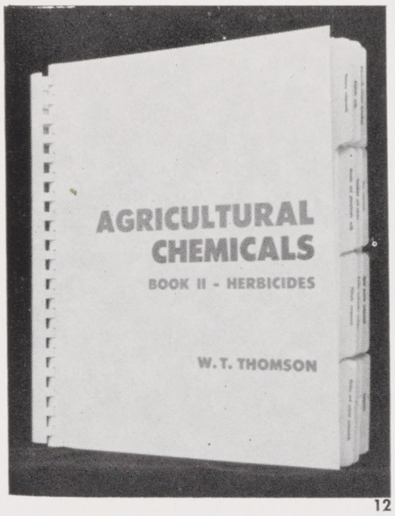
A general comparison of the 1964 crop as it stands at this writing is that it exceeds the previous five year average in yield by nearly a half ton per acre, it exceeds the five year average by 100 pounds of sugar per acre and it equals the five year average in sucrose content. Another facet of the harvest which is quite noteworthy is the clean beets percentage. In this respect a significant improvement is evident with the 1964 crop with a full 1.5 percentage point improvement over the five year average.

The overwintering crop appears to be in excellent condition with no signs of serious disease infections or pest problems. Excellent fall growing weather and more than adequate winter moisture should favor a substantial increase in the present yield figures.

COMPREHENSIVE CHEMICAL WEED CONTROL MANUAL PUBLISHED

JUST ONE YEAR ago this bulletin announced the publication of "AGRICULTURAL CHEMICALS," a 219 page manual of agricultural pesticide chemicals.

Now a sequel to this manual, "AGRICULTURAL CHEMICALS—BOOK II—HERBICIDES" by the same author, W. T. Thomson is available.



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This new volume lists the trade name, type origin, toxicity, uses, important weeds controlled, rates, formulations, application, and precautions in usage of over 500 herbicides. It is a complete guide to the herbicides available commercially and those in experimental stages.

Also included is information on sprayer calibration, mixing and application formulas, conversion tables for liquid, dry and granular formulations, and other data and tables of practical value to any user of herbicides.

AGRICULTURAL CHEMICALS — BOOK II — HERBICIDES may be obtained for $6.50, postpaid, from Simmons Publishing Co., Dept. A., P. O. Box 39, Davis, California.

A hard cover library edition is offered at $8.50.

EXTENSION LEAFLET PRESENTS 1965 WEED CONTROL RECOMMENDATIONS

13

"1965 WEED CONTROL RECOMMENDATIONS" is the title of Leaflet 168, Revised, issued by the California Agricultural Experiment Station Extension Service.

Twenty pages of condensed, tabulated information list available herbicides, application rates and time, weeds controlled and remarks for every California crop from Alfalfa to Walnuts.

Also listed are similar data for nonselective weed control on noncrop land, including recommendations for control of aquatic weeds.

Notes from Our Field Men

C. M. CARLSON - Grimes - Josephine

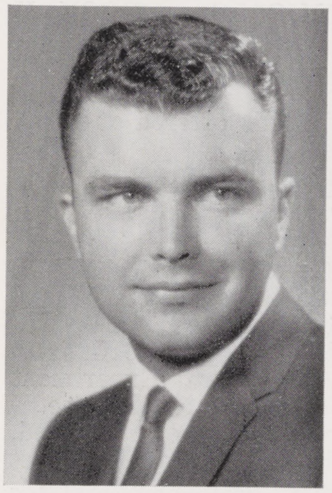
14

A new grower in the Williams area was prepared to spend about $700 to hoe his beets after thinning and before irrigation. This was to eliminate the watergrass and weeds that were missed at thinning time. After irrigation, this grass was about to establish itself and present a problem.

He did not have a weeder harrow, so I suggested he buy a set of Sinner weeders for about $60.00 and save himself some money. This he did, and set out with a determination to make them work. He spent some time adjusting them to where they were doing the best job — sinking them in the soil about 1½ to 2 inches.

The results were most gratifying. A nice 2″ mulch was formed down the beet row, and the weeds were almost 100% eliminated.

RALPH D. HUDEK - Mendota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Weeds in the band directly down the sugar beet row are the most difficult to eliminate. An Orosi man, Arthur Bezzerides, has developed a flat spring steel tool which seems to do a good job in knocking out watergrass from the center of the row.

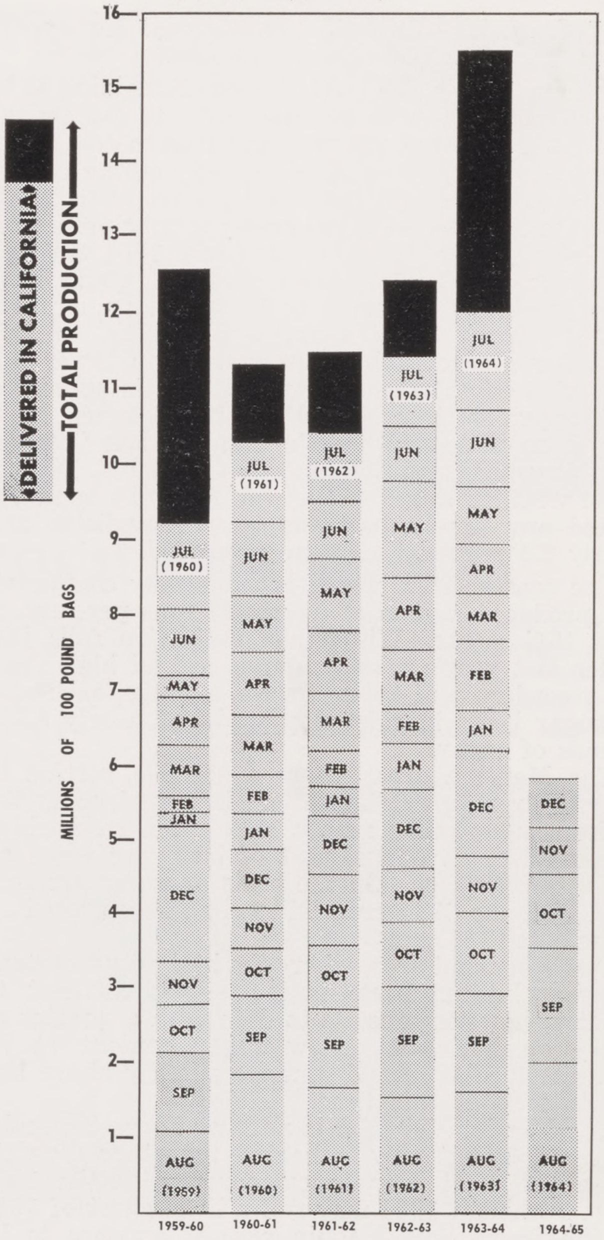
To use this tool it is necessary to rig the cultivator or sled tool bar with the Bezzerides spiders (toothed wheels, similar to a rotary hoe), placed on each side of the row. These spiders mulch the bed, which is a necessary preparation for the spring weeders, which follow the spiders down the sugar beet row. When the spring weeders hit the beets they flex around them, but knock out the weeds between beets. (See cuts 6 and 7, Page 2.)

SPRECKELS SUGAR BEET BULLETIN is issued bi-monthly by the Agricultural Department of Spreckels Sugar Company as a service to its growers. Mention of specific methods, devices and implements does not constitute an endorsement by the Company. All photographs by the editor unless otherwise indicated.

AUSTIN ARMER, EDITOR
SPRECKELS SUGAR COMPANY WOODLAND, CALIFORNIA

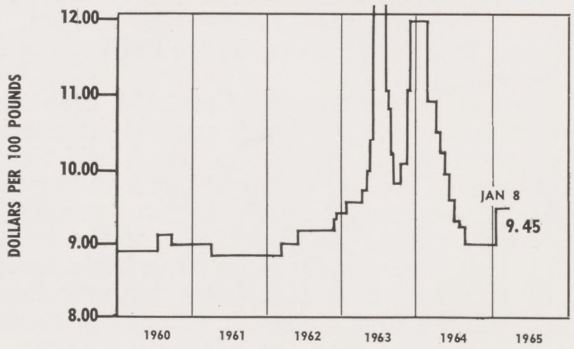
PRODUCTION AND DELIVERIES OF BEET SUGAR

Sales Year – August 1 to July 31



QUOTED PRICE OF BEET GRANULATED SUGAR

In 100 Lb. Paper Bags, F.O.B. San Francisco



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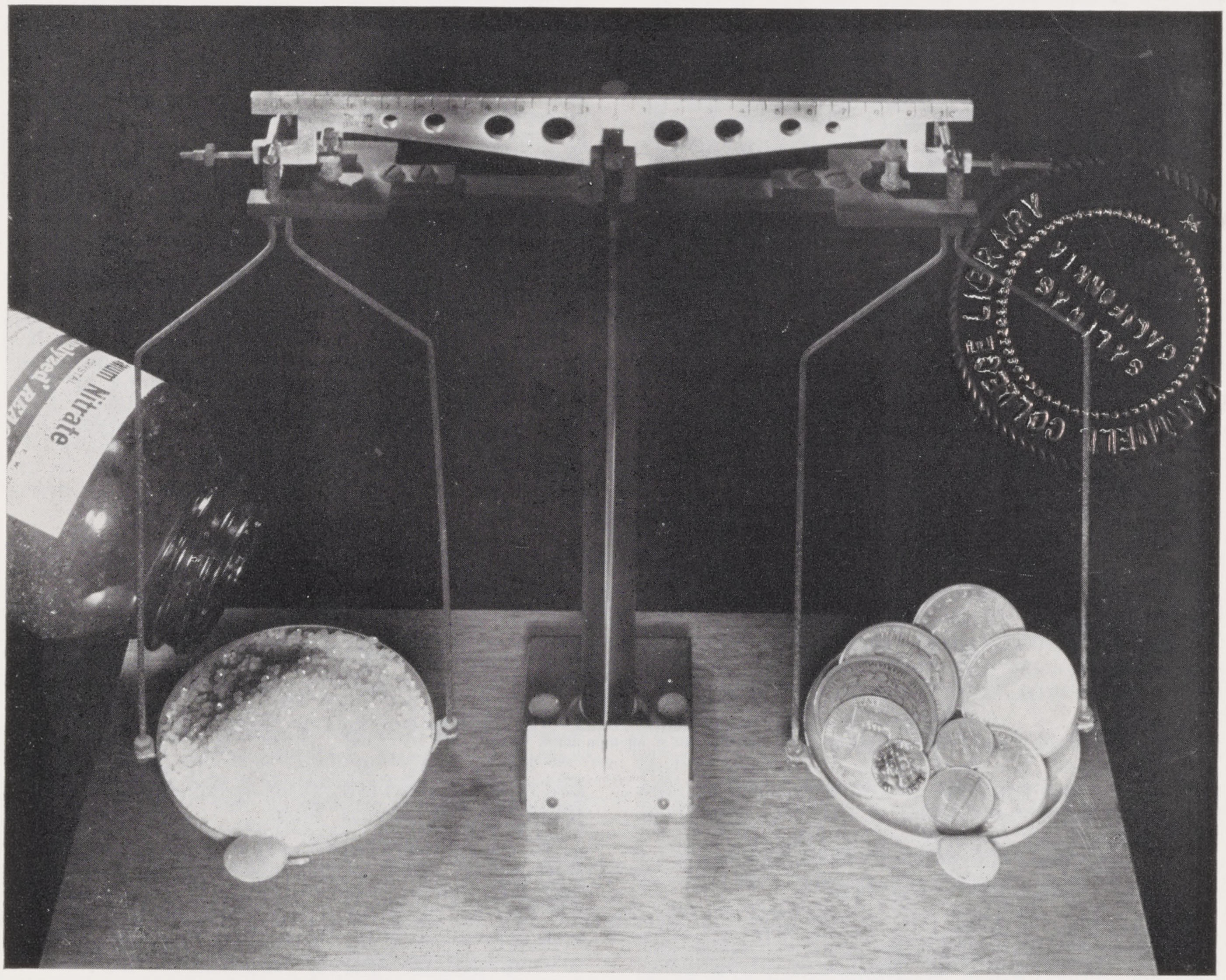
SPRECKELS SUGAR BEET BULLETIN

VOL. 29 MARCH-APRIL, 1965 NO. 2



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BALANCE FERTILIZER AND PROFITS

A fertilizer program should be aimed at maximizing true income from a crop of sugar beets. There is, for each field, a fertilizer rate which will yield the highest profits. See page 10.

NITROGEN MANAGEMENT IS A PAYING PROPOSITION

By LAURN K. BEUTLER, *Agronomist*
Spreckels Sugar Company

APPRAISING A FIELD for fertilizer requirements is an important task in sugar beet production. It is true that a grower can lose money by either under-fertilizing with insufficient nitrogen or over-fertilizing with excessive nitrogen. Excessive nitrogen seldom increases sugar per acre to any advantage beyond the optimum nitrogen rate. Usually, it adds to harvest and hauling costs for the grower because of increased beet tonnage while reducing sucrose concentration.

Sugar beet research indicates a grower can earn from $10.00 to $50.00 per acre by proper nitrogen management. This money is clear profit returned to the grower by reducing his costs without reducing sugar per acre. Beet growers sometimes concern themselves more with tons of roots per acre than pounds of sugar per acre. A good sugar crop is the one with the highest adjusted dollar return to the grower. This adjusted return can be influenced by growing the same amount of sugar in fewer tons of beets (See Table 1). These are actual results from a typical fertilizer experiment—one of the many conducted at Mendota.

TABLE 1

Influence of Nitrogen rate on yield, sucrose percentage and adjusted gross return

Pounds N per acre	Tons Beets per acre	% Sucrose	Tons Sugar per acre	Gross Return ($7.50 N.S.P.)	Fertilizer Cost	Harvest & Haul Cost	*Adjusted Gross Return
0	22.8	13.1	2.99	$270	$ 0	$49	$221
63	29.0	13.0	3.77	$340	$ 4.41	$62	$274
120	30.0	12.5	3 75	$338	$ 8.40	$69	$265
183	32.0	12.1	3.87	$348	$12.81	$69	$266
256	33.0	11.3	3.73	$335	$17.92	$71	$245

*Adjusted gross return was calculated by subtracting nitrogen costs @ 7c a pound and harvest and hauling costs @ $2.15 per ton on a 10 mile haul.

NITROGEN WILL INFLUENCE SUCROSE CONTENT

It has been reported that commercial nitrogen has increased in usage nearly 12 fold in the last twenty years in California. The use of nitrogen has been beneficial to the grower and the sugar industry; however, there is a line of separation between needed nitrogen that is beneficial and excessive nitrogen that is harmful. Excessive nitrogen is detrimental by reducing sucrose content and increasing crop investments in fertilizer, harvest and hauling costs. The data included in Table 1 are typical of the responses of sugar beets to excessive nitrogen as well as to deficient nitrogen in California. Choosing the best characteristic to measure a crop is not always easy. Tons of beets per acre is sometimes misleading as a measure of a good beet crop. Sucrose content is insufficient by itself, while sugar per acre is more reliable when associated with a calculated adjusted gross return as it is influenced by certain fixed costs such as fertilizer and harvest and hauling.

Most growers realize that there is an optimum rate of nitrogen for every beet crop. The searching question is "How can I predict what this crop's requirement will be"? It is generally agreed that a lab analysis of a soil sample is inconclusive in that it measures total nitrogen and doesn't attempt to predict how much of this total N will be available to the plant during the growing season. It is also difficult to predict the amount of residual nitrogen that has accumulated in the soil from fertilizer applications on previous crops, or what portion of this carry-over nitrogen will be made available to the plant by the activity of micro-organisms during the current season. Thus, nitrogen management is a dynamic problem which changes from year to year and field to field.

SUGAR BEETS INDICATE NITROGEN LEVEL OF YOUR SOIL

This problem of nitrogen management is not without solution as sugar beet plants themselves are good nitrogen indicators. Nitrogen deficiency will show in sugar beets as gradations of color and top growth. This will range from large green lush tops, very high in nitrate content, to light green and medium sized tops, to beets deficient in nitrogen with yellow and small tops.

When differing known nitrogen rates are available for contrast comparisons, visual plant readings will indicate at what nitrogen level the plants are feeding. This method of plant reading has been well associated with petiole analysis results and has proven to be accurate in selecting an optimum nitrogen rate in replicated fertilizer trials and in predicting a needed side dress application in commercial fields. Yield results from the replicated fertilizer trials support choices made earlier from visual plant indications.

The principal of using sugar beet plants as nitrogen indicators has been organized into a nitrogen indicator strip technique that every grower can use (without cost) in managing his nitrogen for increased dollar returns.

A good nitrogen strip should contain 4 row strips of three nitrogen rates. At least one rate should be less than the preplant field application. A nitrogen strip conducted for the purpose of fertility manage-

ment should provide realistic levels of nitrogen for comparison. For example, 50 to 60 pound actual nitrogen increments can be useful, but 100 or 150 pound increments are too wide to serve as useful guides. In order to manage nitrogen properly, the fertilizer will need to be applied in two applications. The fertilizer strip should be included in the preplant application followed by a possible side dress application as determined by the indicator sugar beets. A typical nitrogen reading strip might be organized and read as indicated in Fig. 1, following:

← 4 ROWS →	← 4 ROWS →	← 4 ROWS →
Natural Fertility	Field Rate	Double Field Rate
(0 applied N)	50 ℔s. N	100 ℔s. N

FIGURE 1

Let us suppose for illustration that field observations in this nitrogen strip indicated the four rows representing the natural fertility were out of available nitrogen. Their top growth was depressed and lighter in color. Thus, the beets in the field were consuming at least 50 lbs. of nitrogen, and would probably benefit from additional nitrogen. Since it was yet early in the season, the grower and fieldman made a decision to side dress an additional 50 lbs. of nitrogen on the entire field, including the strips, as shown in Fig. 2, following:

	← 4 rows →	← 4 rows →	← 4 rows →
		Field Rate	Higher Rate
Before Side Dress	0	50 ℔s. N	100 ℔s. N
After Side Dress	50 ℔s. N	100 ℔s. N	150 ℔s. N

FIGURE 2

Three weeks previous to harvest the field appeared to be in prime condition, although a lighter green and with less lush top growth than the 150 lb. N. strip. However, at harvest time it produced the same yield, but a higher sucrose percentage.

Critical research has supported this idea that sugar beets are good nitrogen indicator plants and can be used in a practical approach for nitrogen management in every sugar beet field.

1964 NITROGEN STRIP RESULTS

Fifty individual nitrogen strips were conducted in 1964 throughout the Spreckels Sugar Company areas. Periodic root and petiole samples were taken during the growing season to verify visual plant observations. The final results of these nitrogen strips support the technique as a good practical approach that can earn from $10 to $50 per acre for the grower.

It is interesting to note that in one-third of the nitrogen strips the lowest nitrogen rates failed to show any visual symptoms of becoming nitrogen deficient in these locations. The natural fertility of the soil was high enough to carry the optimum crop. This is an indication of residual nitrogen build up in our soils, but should not be used as a general recommendation since many other fields required the highest nitrogen rates for best production. *Every field is different and must be handled as a separate problem.* The data in Table 2 at bottom of page shows how different the relationships can be in two different beet-growing areas.

SUMMARY

On the basis of the 1964 tests, 60% of the 50 nitrogen strips produced the highest sucrose content at the lower nitrogen rates, 34% at the medium, and only 6% at high nitrogen rates. Tons of beets were reversed, with 18% at low nitrogen rates, 42% at medium rates and 40% of the strips were highest in root yields at the high nitrogen rates. Tons of sugar per acre were more equally divided, with 34% of the strips producing their highest adjusted gross return at the low nitrogen level, 40% at the medium and only 20% at the high nitrogen level.

The summary serves to point out the general influence of nitrogen management on sugar beets as measured in sucrose content, yield of roots and sugar, and a calculated adjusted gross return. The latter of these, of course, is the real measure of a good beet crop.

Summaries of the individual nitrogen strips with their visual plant observatons and associated yield and quality information, uphold the nitrogen strip technique as being a practical guide in managing nitrogen to produce an optimum crop as measured by adjusted gross dollar returns. Managing nitrogen fertility according to the indications of your own sugar beet plants in a nitrogen strip has proved to be a sound approach for optimum returns to the grower. It is here suggested that if you are interested in this simple approach, contact your field representative for recommendations.

TABLE 2

Influence of Nitrogen Rate on Yield, Sucrose Percentage and Adjusted Gross Income
In Two Locations

Location	Lbs. N Per Acre	Tons Beets Per Acre	% Sucrose	Tons Sugar Per Acre	Gross Return ($7.50 N.S.P.)	Hvst. & Haul	Fert. Cost	Adjust. Gross Return
Tulare	40	30.9	13.0	4.02	$363.58	$73.75	$2.80	$287.03
County	80	30.6	11.9	3.64	$349.67	$78.48	$5.60	$265.59
	120	28.7	11.3	3.24	$300.84	$70.31	$8.40	$222.13
Monterey	0	37.4	15.2	5.68	$517.24	$80.41	$ .00	$436.83
County	40	40.2	13.2	5.31	$479.59	$86.43	$2.80	$390.36
	80	40.0	13.2	5.28	$477.20	$86.00	$5.60	$385.60

LESS LABOR - MORE MECHANIZATION

By AUSTIN ARMER, *Agricultural Engineer*
Spreckels Sugar Company

FOR MANY YEARS this bulletin has expressed the need to consider mechanizing the springtime beet field operations. This year the compelling need is here—labor shortage—of very serious magnitude.

There have been numerous meetings within our industry to discuss courses of action, and there appears to be a tendency toward "going whole hog" in labor reduction—planting to a stand and hoping for the best. This is *not* a realistic attitude. In most cases, planting a beet seed every 6 inches or more is going to produce a crop of beet seedlings too sparse at best, and a crop of weeds calling for an increase, not a reduction, in the amount of labor required.

The prudent course must be realistic; must recognize that *some* labor will be an almost unavoidable requirement. The real need is for intelligent use of pre-emergence weedicide chemicals, reasonably low planting rates, effective mechanical stand reduction and the best available cultivating tools.

PLANTING RATES

"Planting *Toward* a Stand" is a concept which would seem more practical than "Planting *To* a Stand," since, at planting time, we do not know how many seeds may fail to produce harvestable beets.

Whatever the seed spacing selected, the choice is determined by the known program that will follow emergence, and influenced by the unknown factor of field emergence. Both factors tend to multiply the planting rate beyond that of "Planting To a Stand."

The arithmetic is simple. Suppose we have good emergence, resulting in 2/3 as many plants as planted seeds. Then we go over the field once with a thinner-weeder, and leave 2/3 of the plants. Hence the post-thinning stand will be less than the planted seed spacing by a factor of 2/3 x 2/3, or 4/9. That means that the planted seed spacing must be *at least* 4/9 of the desired beet spacing. So, if we hope to have a beet every 9 inches, we are obliged to plant a seed every 4 inches *at least*.

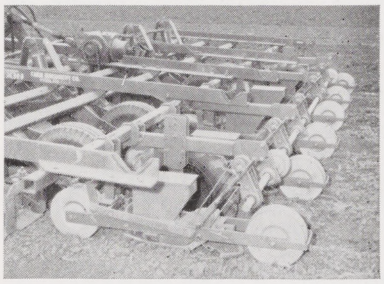
This 4 inch seed spacing can result in a 9 inch beet spacing *only* if emergence is above average. Where experience has shown that soil and climate do not favor emergence, prudence demands that the seeding rate be doubled—a seed every 2 inches.

Thus we arrive at a realistic range of seed spacings — from 2 inches to 4 inches, depending on known field conditions.

Anything *less* than 2 inches means the loss of the benefits of precision planting; there will be double or multiple beets which leave a choice between hand singling and seriously reduced yield.

Anything *more* than 4 inches means an inevitable reduction in sugar per acre, and an increase in late emerging weeds which thrive in the absence of shade from beet foliage.

Several Spreckels growers have planted their 1965 crops, using a 3-inch spacing between seeds. Two growers in the Dixon area have imported Stanhay planters from England. This planter has a reputation for very accurate single-seed dropping. This reputation appears well founded, judging by the 19 seeds this author saw dug up from 60 inches of row following the Stanhay planter at work on the Raycraft contract.



18
ABOVE—Stanhay planter units on a 6-row Johnson sled at Raycraft Bros., Dixon.

RIGHT—Mr. C. J. Ward, representing Stanhay, Ltd., of Ashford, Kent, England, with planter unit.
19

THINNING AND WEEDING

Pre-emergence weedicides are not always effective (See page 5 of the January-February, 1964 BULLETIN). There is no cure-all for weeds (See page 2, same issue). Control of late-emerging weeds is important (See page 3). In other words, a great deal has been said already on the subject of weed control, which goes hand-in-hand with thinning.

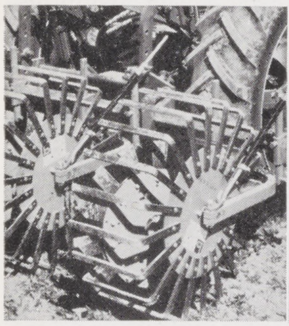
The same false thinking which leads to the concept of "Planting to a Stand" may also lead to the concept of "Blocking to a Stand." There are quite a few adherants to the idea that mechanical thinning is best achieved by chopping out 7 or 8 inches from every consecutive 9 inches of row. This *might* leave a single beet every nine inches *provided* there was one healthy seedling occupying every inch of row.

Practical blockers are, for the most part, designed to leave a block every 4½ inches or less. In this way they double the likelihood that remaining blocks will contain beet plants. But even so, any kind of blocker requires a heavy, uniform beet seedling stand, such as would be very rare if a seed were planted, say, every 3 inches. It is hoped that this explanation will tend to limit the use of blockers to heavy, uniform stands, with most seedlings closer than 3 inches and few gaps of 12 inches or more.

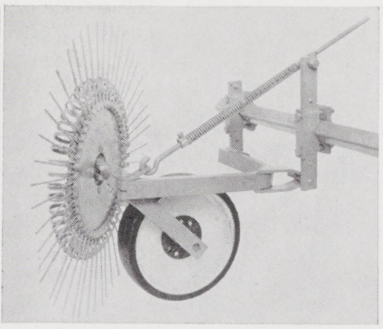
Weeder-thinners differ from blockers in that they all tend to remove a percentage of plants (including weeds) within the row. Thus the final sugar beet stand can be approached a step at a time, and with no risk that any single pass of the machine will irreparably damage the stand.

In the adjoining column a number of mechanical stand reducers are illustrated. Note that Blackwelder, Silver and Speedy offer machines which can be set up *either* as blockers or thinner-weeders. The Melroe Harrow Wheel is strictly a thinner-weeder, as are all forms of spring tine harrows which work across the rows or at an angle to the rows.

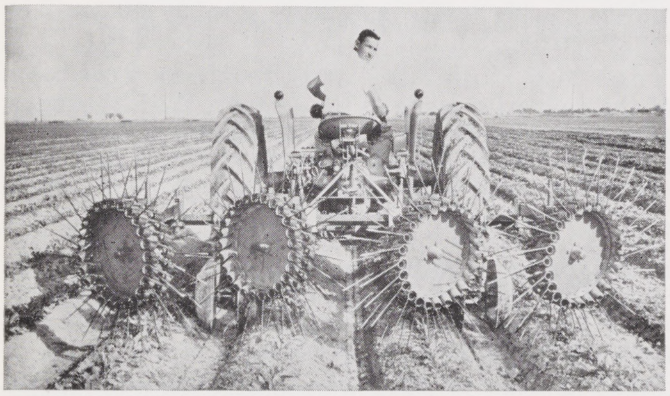
TOOLS FOR WEEDING, THINNING, AND BLOCKING


20 Blackwelder Photo

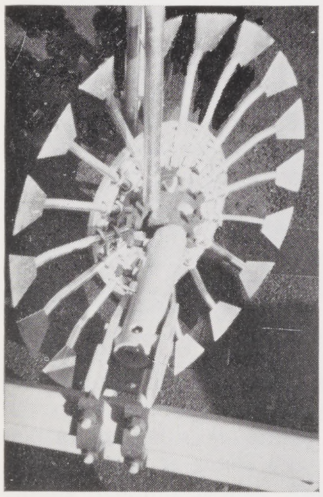
BLACKWELDER BLOCKER leaves undisturbed blocks of adjustable width on 5½" centers.


21

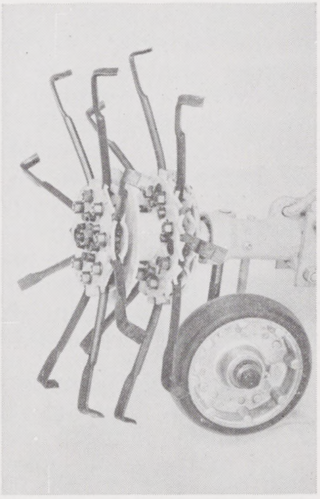
BLACKWELDER TINE WHEEL attaches to basic blocker unit to provide "Percentage" stand reduction and weed removal.


Melroe Photo 22

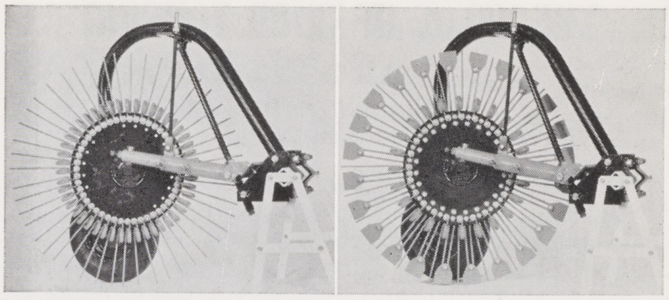
MELROE HARROWHEEL gives "Percentage" stand reduction and weed removal. Double rows of tines give more plant removal per pass than conventional single rows.


Western Mfg. Co. Photo 23

CROPMASTER THINNER is a newly-introduced blocker built by Western Mfg. Co., Casa Grande, Ariz.


Silver Photo 24

SILVER TANDEM HEAD gives wide range of block spacings; weeder head provides "Percentage" stand reduction.


Speedy Photos 25

SPEEDY THINNER has tine weeder wheel (left), to which blocking blades may be attached (right).

SPRECKELS SUGAR COMPANY OPENS PORTLAND DISTRIBUTION FACILITY

ON MARCH 11, The Spreckels Sugar Company officially opened its new sugar distribution facility, located at 1300 Omark Drive in East Portland. Bulk and liquid sugar destined for Oregon's sizeable food processing industry has already begun moving through the big depot. Similarly, grocery product sugar for Oregon households is also distributed from the new facility.

Total sugar storage capacity of the new depot is over 1,000,000 pounds. This includes a 300,000 pound capacity bulk station to serve industrial users of dry bulk sugar, and 25,000 gallons of liquid sugar storage capacity to facilitate service to the area's liquid sugar using industries.

The Spreckels depot is part of a newly completed 80,000 square foot warehouse in the Milwaukee Industrial Park. The one-story concrete structure has covered rail and truck service for protected loading and unloading of sugar in any weather.

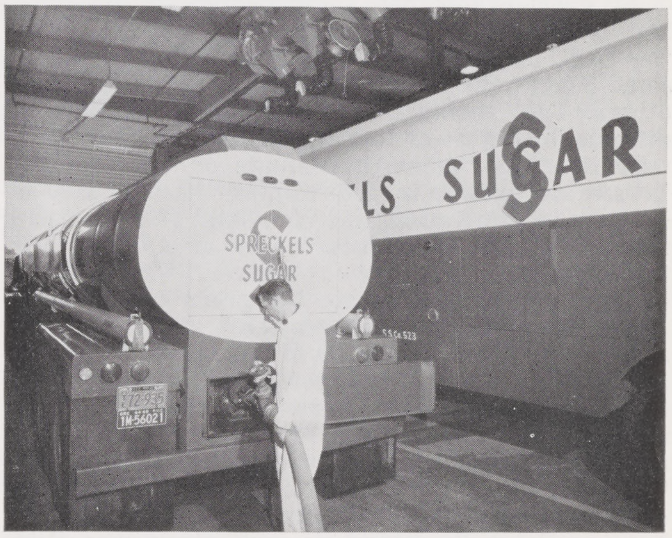


Photo-Art Studios 26

BULK-LOADING of both liquid and granulated sugars is part of the services offered by the new Portland Facility.

THE VALUE OF GOOD TOPPING

By WILLIAM DUCKWORTH

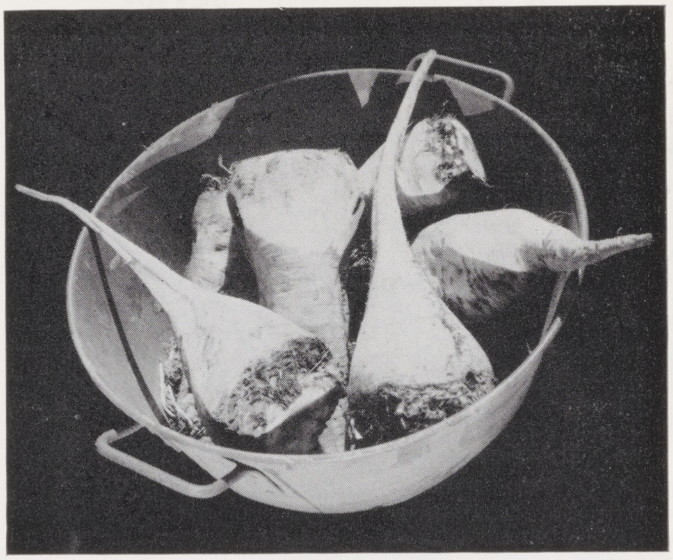
Agricultural Superintendent
Spreckels Sugar Company, Woodland

ANYONE WHO HAS been a reader of this Bulletin for the past few years has undoubtedly become aware of the efforts made by the whole industry to harvest and deliver well-topped beets, free of extraneous trash and dirt. The problem of clean beet deliveries became more serious in direct proportion to the increased use of mechanical harvesters. During this period of mechanization growers, harvester manufacturers and sugar company specialists joined together to develop machines capable of harvesting sugar beets that were fully acceptable by the processors. In addition, more extensive and more costly cleaning devices were installed in the receiving facilities in order to screen out the nonbeet material that the harvesters were unable to remove in the field. Elaborate trash cleaners, rock catchers and washing units were installed at the sugar factories—again with the purpose of removing any material that would interfere with normal slicing of beets.

In spite of all the efforts made, from field to factory, to deliver clean beets to the slicing knives, trash continues to be a problem. Not only trash in the usually accepted sense of weeds and clods, but trash in the form of poorly topped beets. Green leafy material left on the sugar beet is as obnoxious to the mill operation as trash in the form of weed clumps. No one can make sugar from either one—sugar can be made only from the root itself.

The tools have been made available to deliver trash-free and top-free beets. Why then is the poorly topped beet still a problem? The answer is obvious; improper use or adjustment of topping equipment in the field.

All growers top their sugar beets with any number of devices, each adjusted to the conditions of the field being harvested. Conditions vary, with some fields more easily and uniformly topped than others. This variance in conditions makes it very difficult for a grower to determine when his topping operation has become inadequate or unacceptable. To aid the grower in determining the adequacy of the topping operation the Woodland factory instituted a pilot project to measure the amount of green top delivered by the various growers. The tare laboratory personnel separate the green top material from randomly selected growers' sugar samples, and by the weight of crown tare as compared to gross weight, arrive at a percentage of extraneous top material. These top tare percentages are then rated against a standard acceptable percentage, and against the daily average of samples checked. The "Percentage of Top Tare" report is then given to each fieldman every morning. If a grower has deliveries above the standard percentage, the fieldman is able to immediately notify the grower that his beets have had more green top than the average of the deliveries made to the factory. With this type of impartial guide line to go by, it is possible for the grower and the fieldman to go over the field and determine what steps can be taken to do a better job of topping. The cause of the excessive green tops can usually be rapidly determined, and the necessary adjustments or corrections made on the spot. The fieldmen have found that most adjustments are minor, and that the cooperation of the growers is extremely gratifying.



THE SAMPLE determines the growers' payment for each load of beets; it is also a precise measure of the quality of topping and amount of tare delivered.

The delivery of clean well topped beets is important not only to the factory operations but is equally important to the grower. Not only is the grower's total payment influenced by the percent clean beets but the amount of his deliveries can also be influenced by the condition of the beets. Grower *deliveries* per day is based on the total tons *sliced* per day by the factories; anything that reduces the slice reduces total deliveries made by growers. Clean beets allow a greater slice, while poorly topped beets necessitate more knife changes and reduce the factory slice. Approximately 10 tons of slice is lost per knife change at the Woodland factory; therefore, if trash is responsible for twenty knife changes in a twenty-four hour period, some 200 tons of slice has been lost that day. If this happens over a week, approximately 1400 tons of slice has been lost. This means that 1400 tons of beets were not delivered that could have been delivered.

In one period during the fall of 1964, which coincided with the start of the measurement of crown tare, knife changes were reduced approximately 75%; to the point where very little if any actual slice was lost. Examples like this made the value of crown tare determination abundantly evident, and emphasized the desirability of doing everything possible to deliver to the sugar factories the cleanest beets that men and machines can harvest.

DR. BENNETT WILL RETIRE

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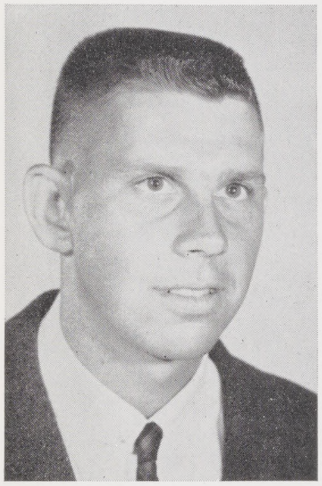
DR. C. W. BENNETT will retire on April 9, 1965, after a long and distinguished career of more than 40 years in plant virus research. Thirty-six of these years have been devoted to sugar beet virus research, first at the U. S. Department of Agriculture's Sugar Plant Investigations Laboratory, Riverside, California, and latter at the U. S. Agricultural Research Station, Salinas, California. At Salinas he also served as Station Superintendent from 1954 to 1964.

Dr. Bennett's penetrating research in the study of the virus and vectors responsible for Virus Yellows and Western Yellows in sugar beets has been a priceless contribution to California's beet sugar industry.

Following retirement Dr. Bennett plans to continue a few of his research activities and do some traveling with Mrs. Bennett. He will maintain an office at the U. S. Agricultural Research Station.

Notes from Our Field Men

W. W. PORTER — Woodland

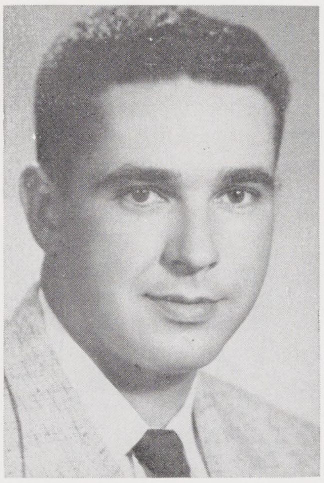

29

Last week I sampled a fertilizer strip test in my district. The soil was very wet from recent rains, and I was surprised at the relatively high sugar percentages throughout the test strips. The table which follows demonstrates a clear and consistent relation between nitrogen and adjusted gross returns.

I think it is safe to say that the optimum amount of nitrogen for this crop would have been between 115 and 190 pounds per acre, but just where between is difficult to say. If an additional strip of, say 150# had been set up, it would have been a good indicator as to the proper amount.

Amount N lbs./Acre	Tons Per Acre	% Sugar	Tons Sugar Per Acre	Gross Return	Fert. & Harv. Cost	Adj. Gross Return
40	21.7	16.9	3.67	$335.48	$32.55	$302.93
115	31.8	16.8	5.34	$488.77	$52.95	$435.82
190	34.9	16.4	5.72	$522.80	$62.85	459.95
240	35.1	15.5	5.44	$495.61	$66.65	$428.96

S. D. BAYER — Mendota

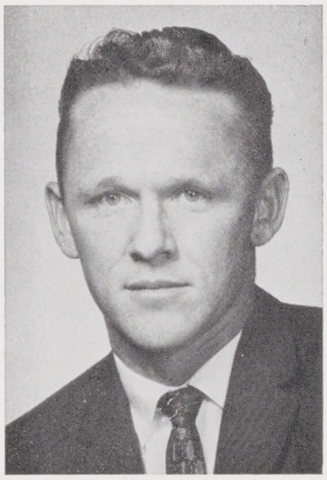

30

Melroe has begun marketing a device called a "Harrowheel." First developed by an independent dealer in Riverside, California, it consists of spring teeth mounted on a wheel, similar to a Speedy tine wheel. This gives the same effect traveling down the row that a spring tine harrow would traveling across the row.

Several units were built and sold in the Fresno area and have been in use for two years. Growers who have used them are quite happy with the results. When first developed, it was given the name "Chicken Picker" because of its resemblance to a machine used for that purpose.

Editor's Note—The Melroe Harrowheel is now a production item, and widely distributed. It is illustrated on page 13.

ROBERT ALDERSON — Bakersfield


31

Successful farming of beets in windy areas is a problem in many districts of Calif. and especially so in the Wheeler Ridge area of Kern County which is very sandy. One farmer who has been particularily successful in farming in this area is Dutch Hudiburg of Arvin.

Dutch has not used a plow on his ranch for approximately seven years. The reason for this being that all the residue from previous crops is wanted on the surface to help hold the soil. Deep tilling of the soil is accomplished by pulling a 6 ft. horizontal blade about 25" deep. A lifting action is accomplished by setting the blade at an angle which results in the soil being raised and then dropped. Subsoiling is incorporated into the operation on alternate years. The soil is then disced once or twice, and then is either pre-irrigated or ridged up for planting and then irrigated. Irrigating before making the furrows is a better practice, since a cloddy structure is obtained which helps prevent soil movement from the wind.

Planting should be done with a planter which does not scrape off the top of the bed, but instead

(*Continued on next page*)

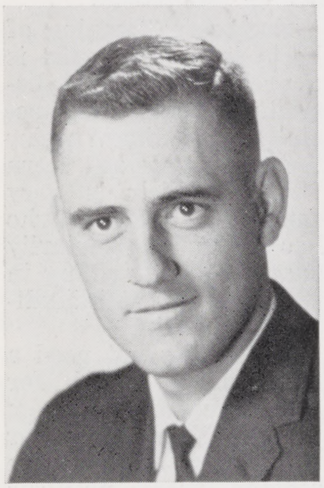
Continued from Page 15

disturbs only the portion in which the seed is placed.

Sprinkler irrigation lends itself well to the wind problem from here on. As soon as the beet seedlings emerge, they are sprinkled for approximately 12 hours so as to form a crust about ½" thick. If the seedlings have not emerged, one or two light sprinklings can be applied so as to form a light crust, and at the same time keep the soil soft enough to let the seedlings emerge.

Although many people think a crop cannot be grown without the use of a roller or Til-n-pak, this is one of the quickest methods of getting their beets transplanted into the next county in a windy area. If for some reason crust must be broken; a small strip just above the seed should be broken, and the remainder of the bed left un-disturbed. Dutch uses a Planet Jr. planter to plant his beets, and when a crust is formed and needs breaking, the shoe is removed from the planter and then the planter is re-run over the seed to shatter the crust. Cultivation is avoided as much as possible, as is any other operation whih would loosen the soil, until the beets are about 2½" high. When cultivation is required, the sprinklers are moved in as soon as possible to re-establish the crust.

OLEN C. ZIRKLE, Jr. - Manteca



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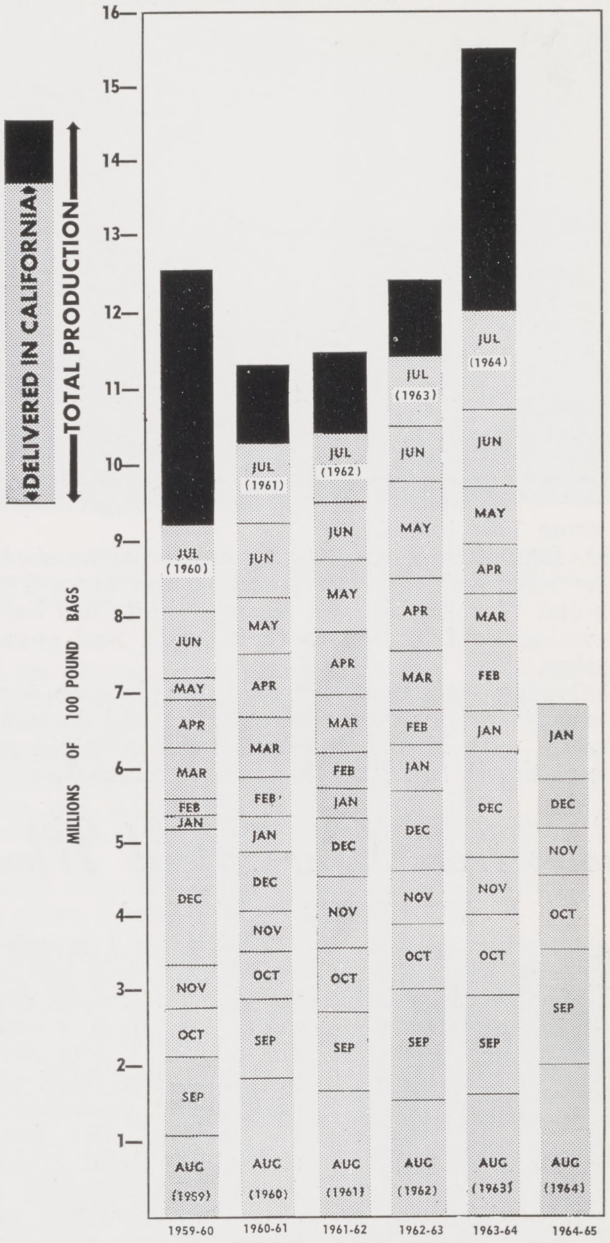
Merlin Miller, a grower in the Collegeville area, has devised a workable combination of mechanical and hand thinning. He has found that by making several passes with a Melroe Harrow, followed by one pass with sickle sections that he can reduce his hand thinning bill to as low as $13.00/acre.

The results of this combination were quite apparent when a stand count was taken on a plot located in this field. The stands average 100-120 beets/ft. of row, which is about average for the area. The real significant advantage of this method of thinning is that it leaves little or no doubles. Almost all of the seed in the plot was whole seed, which presents quite a problem to any type of thinning process, yet the incidence of doubles was probably less than 5%. With results like this, I feel that this combination will please the most dubious grower.

SPRECKELS SUGAR BEET BULLETIN is issued bi-monthly by the Agricultural Department of Spreckels Sugar Company as a service to its growers.
Mention of specific methods, devices and implements does not constitute an endorsement by the Company.
All photographs by the editor unless otherwise indicated.
AUSTIN ARMER, EDITOR
SPRECKELS SUGAR COMPANY WOODLAND, CALIFORNIA

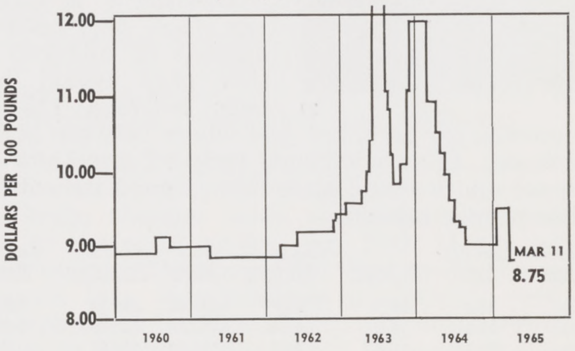
PRODUCTION AND DELIVERIES OF BEET SUGAR

Sales Year – August 1 to July 31



QUOTED PRICE OF BEET GRANULATED SUGAR

In 100 Lb. Paper Bags, F.O.B. San Francisco



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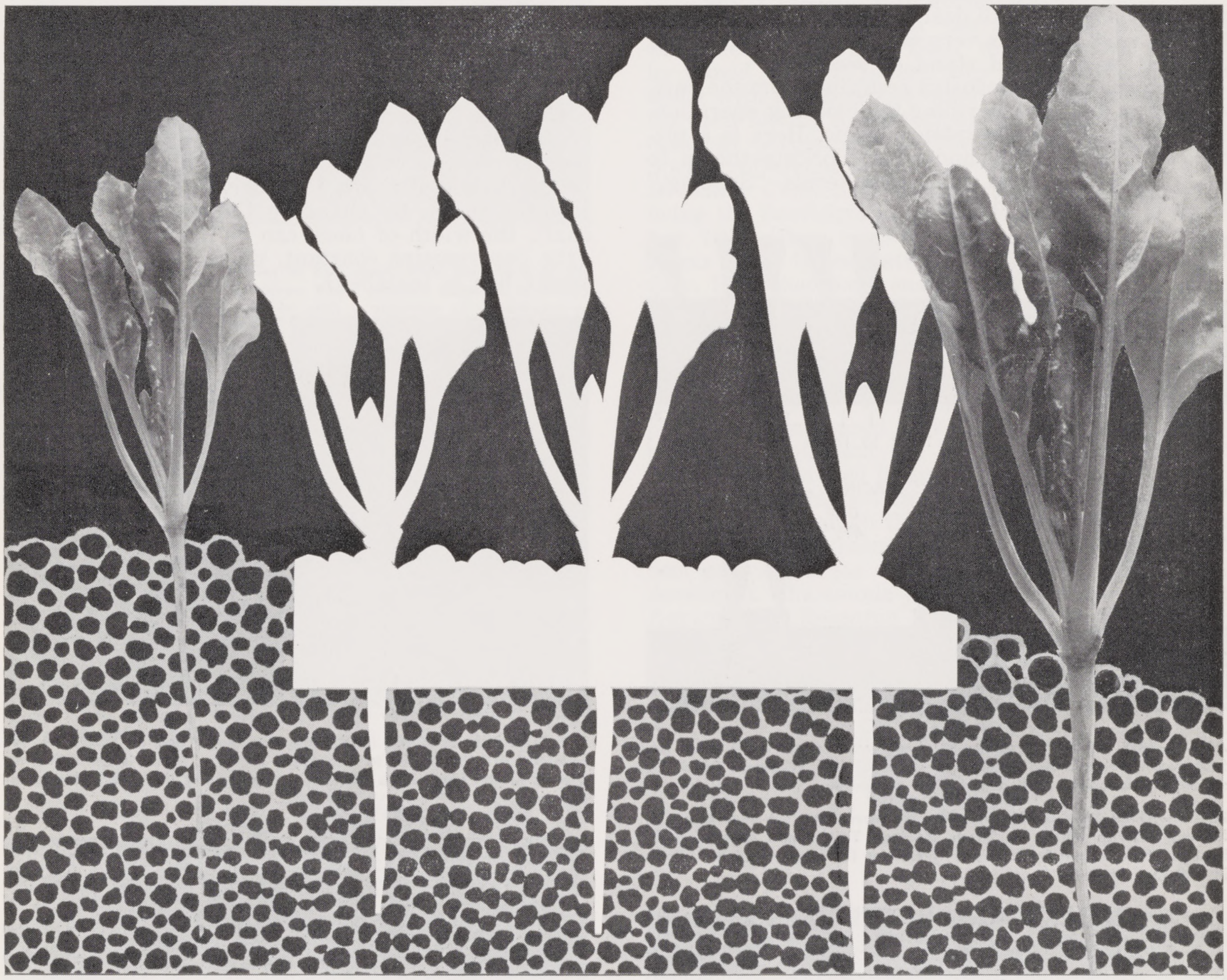
PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

SPRECKELS SUGAR BEET BULLETIN

VOL. 29 MAY-JUNE, 1965 NO. 3



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A UNIFORMLY SPACED STAND

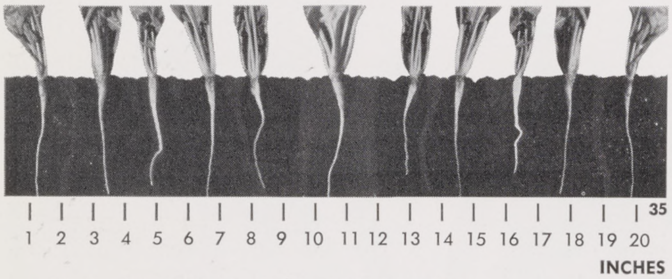
can be effectively thinned with a mechanical blocker. See page 18.

BLOCKING--ONE WAY TO THIN BEETS

By AUSTIN ARMER
Agricultural Engineer
Spreckels Sugar Company

IN THE LAST issue of the BULLETIN, (Vol. 29 No. 2, P. 12), the general subject of spring mechanizations was discussed, and the distinction between blockers and weeder-thinners pointed out. The present discussion will deal with blocking—one way to thin beets which is very satisfactory *if* there is a uniform, well spaced stand of seedlings.

To clear up any confusion resulting from the various words used in describing the blocking operation, let us look at the illustration below. Here is a picture of a row before and after blocking shown to scale (1/6 life size), with the terms "Spacing," "Block" and "Gap" defined.



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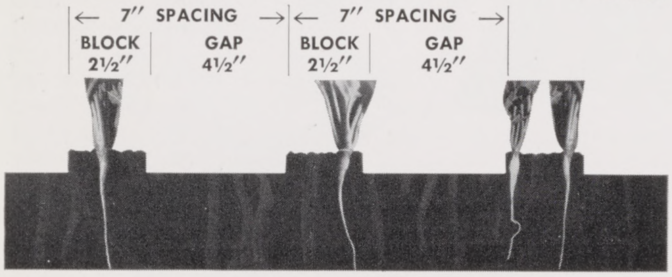

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ABOVE—THIS STAND (6.6 plants per foot) would result if 10 seeds per foot were planted, and emergence was 66%. It is almost ideal for subsequent blocking, illustrated in the cut below.

BELOW—AFTER BLOCKING, 4½-inch gaps have been cut from the row, leaving 2½-inch blocks on 7-inch spacings. Two blocks contain single beet plants; one contains a double; there are 185 beet containing blocks in 100 feet of row.

BLOCKER CHARACTERISTICS

Six blockers (here pictured) have been field-tested, and measurements made on the dimensions of the resulting spacings, gaps, and blocks. The figures tabulated below represent the normal range of adjustment for each machine, and are therefore conservative. However, if this range of adjustment is exceeded, operation may become unsatisfactory.

Make of Blocker	Spacing (Inches)	Gap (inches)	Block (Inches)	Removal (Percent of Row)
Blackwelder	5¼	2 - 4	1¼ - 3¼	38 - 76
Cochran	5 - 10	4½	½ - 5½	45 - 82
Cropmaster	6 - 7½	4 - 4½	1½ - 3	53 - 75
Eversman	2½ - 5	⅜ - 8¾	1¼ - 4¼	15 - 70
Silver	1⅝ - 3-5/16	1¼ - 2⅝	7/16 - 2-1/16	37 - 75
Speedy	6 - 7½	4 - 4½	1¼ - 3	53 - 75

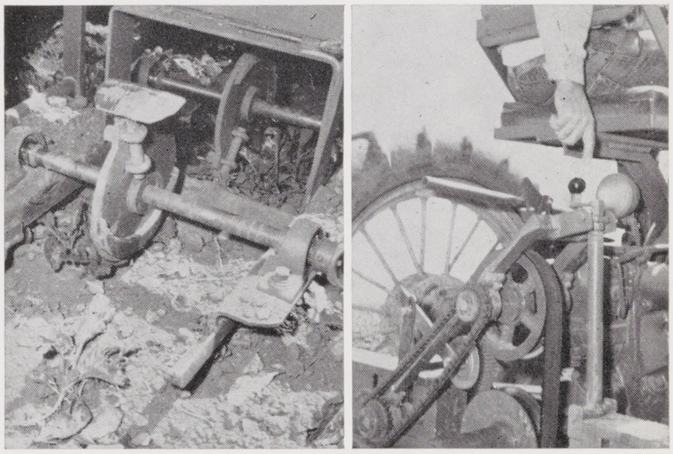
STAND REQUIREMENTS

Blocking requires a more uniform and precise stand than does random thinning (as with a tine weeder or harrow). A planting rate between 6 and 10 seeds per foot should be used in the hope of securing a stand of seedlings spaced between 1½ and 3 inches apart, with few gaps of 12 inches or more.

If plants are closer than 1½ inches apart, the blocker will leave too many doubles or clumps. (Monogerm seed is an important factor in reducing the number of clumps).

NEW BLOCKER OFFERED

Cochran Equipment Company of Salinas has literally mechanized the "man with the hoe." Their blocker consists of a 4½″ hoe which is rotated on a counterbalanced shaft, PTO-driven at a readily adjustable speed. By changing the speed of the hoe-shaft, the width of *block* can be made more or less (the *gap* remains constant, unless a wider or narrower hoe is installed).



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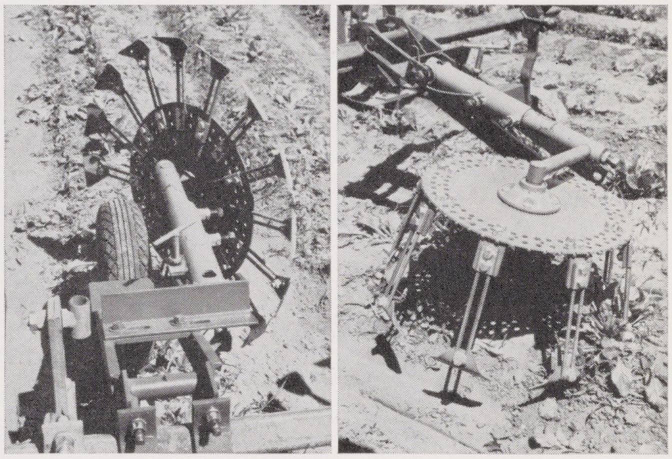
THE COCHRAN BLOCKER (left) employs a single hoe on each row, rotated by PTO-driven shafts. The speed of these shafts is controlled by a twirl of the black knob (right), thereby varying the width of remaining blocks.



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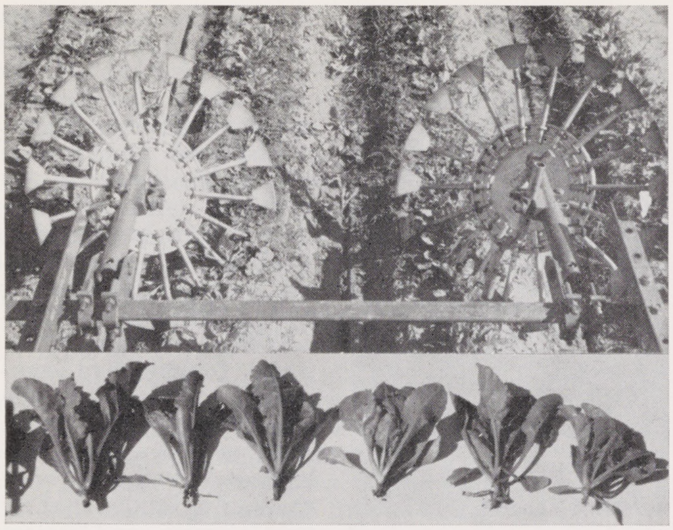
TWO VERSIONS of the Speedy blocker. Radial knife arms are shown at left; co-axial at right (any resemblance of the latter to the Rolinda Weeder & Mulcher is purely coincidental).



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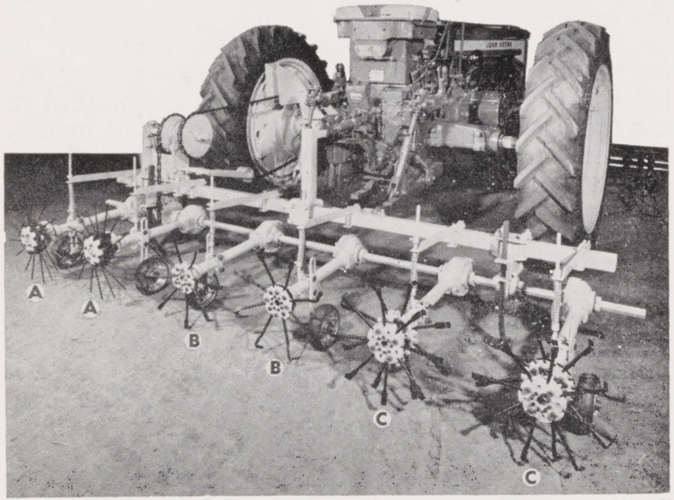
THE CROPMASTER BLOCKER does its best work when the plane of the wheels is quite flat, as shown above. When properly adjusted, it cleanly slices off the excess plants (below) with a minimum of disturbance to remaining plants.

BMC Photo 40

THE BLACKWELDER leaves blocks on 5¼ inch centers, removing gaps from 1.6″ to 3.9″ long. Rolling fingers hold down the blocks, preventing acccidental removal.



Silver Photo 41

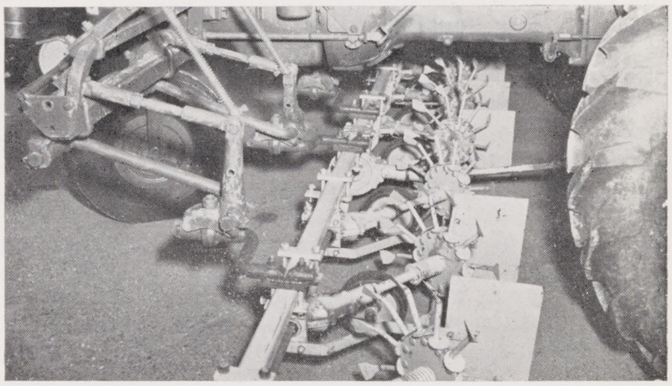
THE SILVER WITH tandem heads (C,C) leaves blocks on 3-5/16 inch centers, removing gaps from 1.3″ to 2.6″. Spring tine weeder heads (A,A) permit it to be used as a thinner-weeder.

VIACHESLAV F. SAVITSKY -- 1902-1965

WITH DEEP REGRET we report the death of Dr. V. F. Savitsky on April 16, at the age of 62. The sugar industry mourns the loss of an outstanding geneticist—the man who, aided by his wife, Dr. Helen Savitsky, gave the world monogerm sugar beet seed.

Since their marriage in 1926, the Savitskys have been active in sugar beet genetics—their career having begun at the sugar beet breeding station at Belja-Zerkov, Russia. Their work was interrupted by World War II; indeed they might have perished along with thousands of other displaced persons but for their having found temporary refuge in a UNRA camp in Germany. With the help of the American Society of Genetics and the Curly Top Resistance Breeding Committee arrangements were made to bring the Savitskys to the United States in November, 1947. They were headquartered at the USDA Sugar Plant Investigations Laboratory at Salt Lake City. Here they were enabled to continue their studies in the monogerm characteristic which they had started in Russia.

In 1948, Dr. Savitsky searched for and found monogerm plants in a sugarbeet seed field near Salem, Oregon. Seed from the original monogerm plants was increased and distributed to sugarbeet breeders throughout the United States. Plants arising from this seed lacked vigor, disease resistance, and other characteristics necessary for commercial production. Through the efforts of Dr. Savitsky and others breeders, monogerm varieties adapted to all beet growing areas of the United States have been developed. The couple was transferred to the U. S. Agricultural Research Station at Salinas in 1961, where Dr. Helen Savitsky will continue her work.



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THE EVERSMAN leaves blocks from 2.25″ to 10.5″ on centers, removing gaps from 0.3″ to 8.7″ long.

THE MITE PROBLEM IN NORTHERN CALIFORNIA SUGAR BEET FIELDS

By DR. JAMES L. REED*

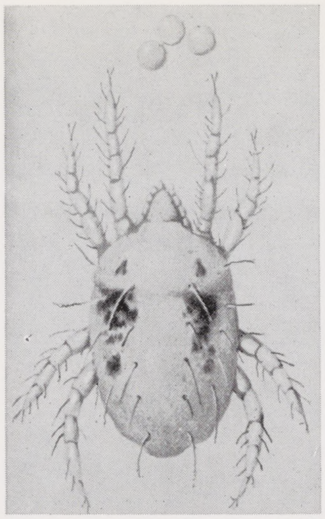
THE TWO-SPOTTED MITE, *Tetranychus urticae* Koch (=*T. telarius* L. or *T. bimaculatus* Harvey) has long been recognized as a pest species of worldwide distribution and economic importance. Its depredations to California agriculture are evidenced by the most recent estimate of crop losses by the California State Department of Agriculture which placed it seventh among single species at an annual cost of $4,514,745. This mite attacks a tremendously wide range of valuable crops including apples, pears, a variety of stone fruits, walnuts, citrus, a multitude of vegetable and field crops, strawberries, greenhouse plants, cotton, and many others.

While a closely related species, *Tetranychus cinnabarinus* (Boisduval), the carmine or red spider mite, has been established as an economically important pest of sugar beets in the southern desert valleys of California, such an evaluation of the two-spotted mite in northern California has not been made at this time. However, observations made by many people associated with sugar beet production and research in recent years have indicated an increasing incidence of this species and its related plant injury. In the Sacramento Valley, these observations have usually been made near to or at the time of the earlier fall harvesting operations. Unfortunately, this has not always been the case in the southern and central San Joaquin Valley where earlier buildups have been noted with some concern. During 1964, these population increases resulted in many fields of these latter areas becoming heavily infested by mid summer. Subsequent inquiries concerning additional control measures and possible damage to the crop prompted a preliminary investigation. The results are reported in this article.

MITES DESCRIBED

In order to better understand the complexities associated with the problem of controlling or evaluating mite populations in the field, some knowledge of the pest's biology is essential. Such an understanding also helps one to appreciate the explosive character of these populations and the conditions which favor the costly outbreaks long famiiar to growers of many commodities other than sugar beets.

Adult females are approximately 0.020 inch in length, while males are slightly smaller and have abdomens which are noticeably narrowed posteriorly. Their color is usually green but may vary from green to yellow or orange with a large dark spot or a cluster of small ones on each side of their upper surface. Mites tend to become darker in cool temperatures or as they become older. In addition, some strains of this species produce females which may be either dark red or carmine in color. The barely visible eggs are globular or spherical and whitish in contrast to the somewhat larger, oval, and more translucent eggs of predaceous phytosiied mites often found in association with them. A very fine, but abundant, webbing and its accumulation of dust, along with a whitish or yellowish discoloration of injured foliage, are common symptoms of the presence of this mite. The newly-hatched six-legged nymphs are rounded and nearly transparent and colorless until becoming greenish after feeding.



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Tetranychus urticae Koch, the two-spotted mite. (After deOng)

After molting, the nymphs have eight legs and move about freely while feeding before their second and final molt to adulthood. Mating is accomplished immediately after the final molt when the males are present. Female progeny are produced as long as the eggs are fertilized but male offspring begin to appear as the female's sperm storage is depleted.

TEMPERATURE DETERMINES POPULATION

Developmental time varies considerably with temperature, e.g., maturity may be reached within five days at 75°F. or higher but may require as long as forty days at 55°F. Egg incubation may occur in two to three days at 75°F. but may be over twenty-one days at 55°F. Under moderate temperatures of 60° to 70°F. in the greenhouse, the incubation period is from five to ten days and maturation time from ten to fifteen days. This type of temperature response coupled with the fact that each female may produce from 100 to nearly 200 eggs during her average adult life of three to four weeks creates an enormous reproductive potential as temperatures reach 75° to 80°F. The variability which a population may exhibit in this temperature response is exemplified in the fact that *one female* may give rise in one month, through succeeding generations, to a progeny of only twenty mites at 60°F., about 13,000 mites at 70°F., and *over 13 million* mites at 80°F.

Certain other factors influence the buildup of mites to a somewhat lesser degree than temperature but may be very important in regulation of localized populations. These factors include a wide variety of arthropod predators represented by certain predaceous thrips species, lacewing larvae, members of the ladybird beetle family, hover fly larvae, minute pirate bugs, big-eyed bugs, and predaceous phytosiied mites. One particular predaceous mite, *Phytoseiulus persimilis* Athias-Henriot is gaining increasing recognition in the biological control of the two-spotted mite in the southern California strawberry crop. It should be mentioned that applications of non-specific insecticides which remove

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Davis, California
(Stationed at the Departmental Research Laboratory, Salinas)

various predator populations have been shown to result in extremely rapid mite increases when climatic conditions become favorable. The presence of several inert materials on leaf surfaces, e.g., road dust, and high nitrogen levels in plants are also known to be favorable to mite reproduction. It has also been demonstrated that relative humidities over 80% and below 25% prevent normal development and that extreme crowding exerts a "self-limiting" influence so that declines from high population levels do occur in response to population pressures.

FIELD TRIALS

During 1964, a field trial for the evaluation of mite control and yield effects were conducted on the McCarty-Hildebrand Ranch near Burrell with the cooperation and assistance of Larry Burtch, Laurn Beutler, Dan Banta, Ralph Hudek, and Wes Stroud of the Spreckels Sugar Company at Mendota. Four miticides were applied to the plot which contained two replications of each treatment and three replicates of the check or untreated area. The materials used and rates for each were as follows: 1) Kelthane®, 1.38 lbs. active ingredient per acre; 2) Aramite® technical concentrate (8.0 lb./gal.), 1.0 lb. active ingredient per acre; 3) Ethion® emulsifiable concentrate (4.0 lb./gal., 1.0 lb. active ingredient per acre; and 4) Morestan® wettable powder (25%), 0.5 lb. active ingredient per acre. Except for the Morestan® formulation, all materials were applied with Triton B-1956 for additional wetting. Fifteen gallons of water per acre were used in each trial for the airplane application. Of these materials, only Ethion® and Kelthane® are currently registered for use on sugar beets, but both have the restriction of forbidding the feeding of treated tops.

The selection of the plot area was a matter of compromise because none of the materials tested are registered for use on feed or forage crops and drift contamination on adjacent fields posed a critical problem in several areas where high mite populations were encountered. The field which was used, with its adjacent cotton acreage, represented such a compromise but posed two important problems. These were: 1) the plant stand was variable and growth somewhat irregular; and 2) mite populations were highly dispersed, i.e., highly concentrated on some plants and non-existent on others.

RESULTS

The results obtained from the application of these miticides are presented in Table 1. The numbers obtained represent the total number of mites, mite eggs, predaceous mites and eggs counted within four 0.5 inch circles on each of fifty leaves taken from each replication. Thus, the averages shown are derived from a total of one hundred and fifty leaves from the check areas and from one hundred leaves in each of the treated areas. It may be seen that good to excellent control over the check populations was obtained within seven days following application. However, check populations declined to very low levels after eighteen days and even though significant control could still be observed, the influence of these lower populations on plant growth at that time appeared questionable.

TABLE 1.

EFFECT OF MITICIDE APPLICATIONS ON TWO-SPOTTED MITES IN SUGAR BEETS

Sample Date — August 12, 1964

	MEAN NUMBER				
Treatment	Live Mites	Mite Eggs	Predaceous Mites	Predaceous Mite Eggs	Percentage Leaf Area Damaged
Check	62.41	47.12	3.15	2.90	83.3
Kelthane	14.80	4.10	1.00	1.00	63.5
Aramite	24.85	5.30	3.50	2.05	77.0
Ethion	6.05	2.85	0.50	0.75	73.7
Morestan	13.17	4.20	1.95	1.20	74.3
Sample Date — August 24, 1964					
Check	8.48	3.16	0.28	0.28	60.5
Kelthane	0.22	0.10	0.56	0.00	61.4
Aramite	1.74	0.78	0.12	0.24	57.2
Ethion	3.34	1.44	0.39	0.04	63.8
Morestan	1.00	0.56	0.54	0.06	62.4

*Applications by airplane on plot near Burrell, California (McCarthy-Hildebrand Rranch) made 8/6/64.

TABLE 2

INFLUENCE OF FOUR MITICIDES SPRAYED BY AIRPLANE ON SUGAR BEETS GROWN NEAR BURRELL, CALIFORNIA

SUCROSE %	Kelthane	Morestan	Aramite	Ethion	Check
Aug. 31	13.4	13.5	14.0	15.2	14.7
Sept. 16	14.4	15.2	15.0	15.5	14.8
Oct. 26	16.5	16.2	16.4	16.5	16.6
TONS ROOTS/ACRE					
Aug. 31	21.9	24.8	30.1	24.0	30.9
Sept. 16	29.2	27.8	30.7	26.0	36.2
Oct. 26	30.7	29.9	35.8	32.8	34.2
TONS SUGAR/ACRE					
Aug. 31	2.93	3.35	4.21	3.65	4.54
Sept. 16	4.20	4.22	4.60	4.03	5.36
Oct. 26	5.06	4.84	5.87	5.41	5.68

*All plots sprayed on August 6, 1964.

The effects on yield, as indicated by sampling short lengths of row, are shown in Table 2. Although every possible attempt was made to sample from rows of approximately equal stand value with regard to plant density, general vigor, etc., the high degree of variability within plots is believed to have influenced the validity of these data. The consistently high rate of sucrose increase in all treatments over the check on September 16th from the original sampling of August 31 may reflect the most significant influence of mites on beet production, i.e., depression of sucrose as foliage damage increases. Beyond that date, the recovery of all beets from the prior mite damage appears to manifest itself so that no differences could be detected at final harvest. No explanation of the gross tonnage figures is possible beyond saying that extreme variability within the plots (which was obvious in the original data) could be largely responsible.

Continued on Page 24

Notes from Our Field Men

Field Superintendents report items of unusual interest so that others on the agricultural staff will have the benefit of their findings.

These columns, from time to time, report those items which seem to be of direct value to sugar beet growers.

W. H. HODSON — GOSHEN

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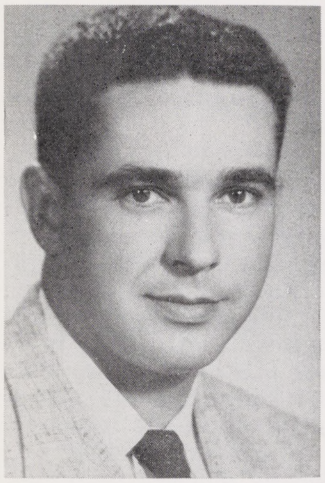
The greatest contribution to mechanical thinning in the district to date was made by those growers who proved to themselves and their neighbors that monogerm, non-pelleted sugar beet seed could be precision planted. Plant spacings of 1½ to 2½ inches were successfully obtained when care was taken in adjusting planters and the plant operation itself was closely supervised.

Unfortunately, practically all of the growers who obtained stands of uniform, well-spaced beets lost all of their nerve at thinning time and employed hand thinners.

The fact remains, however, that if exorbitant costs or the lack of labor had required mechanical thinning, it could have been satisfactorily employed.

S. D. BAYER — LINCOLN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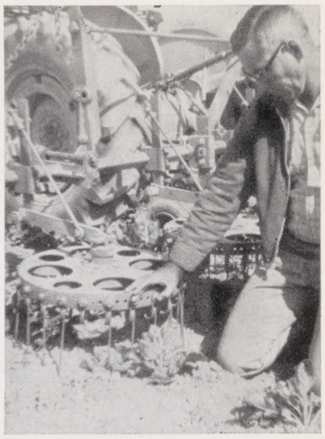
In March of 1965, R. O. Stevens of Giusti Farms, Inc. and myself began discussing a way we could effectively pass spring weeder teeth through the row in opposing directions while traveling with the row and cultivate a wider band than has been possible with present down the row weeders.

The result is a down the row weeder consisting of a horizontal wheel (one per row) 22″ in diameter, with tines mounted vertically around the circumference of the wheel at intervals from 1″ to 4″ depending on stand conditions. On bed plantings the axis of the wheel is offset approximately 6″ from the row. Since the teeth are in the bed on one side and over the furrow on the other, the wheel will revolve as the tractor travels down the row. With the wheel in this position the teeth pass through the row twice per revolution in opposing directions at a 45° angle. The units are built so that they may be tilted forward or backward, or to one side or the other.

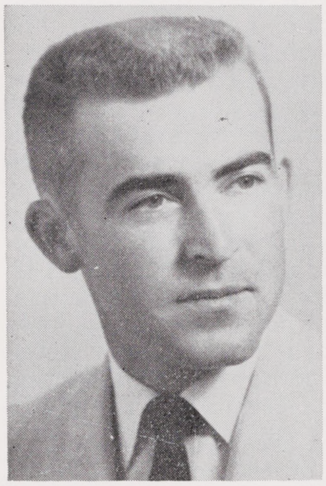
To date several 4 row units and two 8 row units have been built and are in use in the Fresno area. Approximately 2000 acres have been weeded with these and show very good results.

Rolinda Equipment Company of Fresno has applied for a patent and has begun producing them on a limited scale.


S. D. Bayer Photo 46

ROY STEVENS with the Rolinda Weeder & Mulcher which he helped design.

ART YOUNG — SPRECKELS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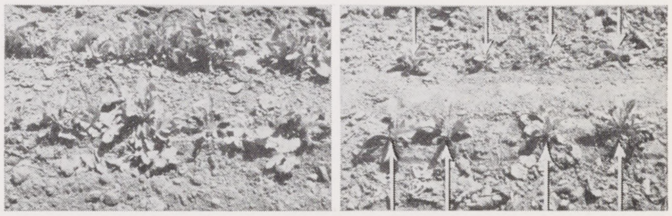
I have just finished thinning considerable acreage and have come to the conclusion that a 2.0″ plant spacing will give the best end results when thinned with a mechanical blocker.

Plantings spaced 2.6″ had a low emergence percentage, but could be thinned by hand very cheaply. Elwood Fontes in the Blanco area got his beets thinned by hand for a flat $15.00 per acre behind a 2.6″ precision planting at a $1.25 per hour rate.

Cy Mann planted with 2.0″ between seeds. It cost him $45.00 per acre at $1.25 per hour rate to hand-thin to nine inches and clean up the weeds on half of the field. On the other half of the field he used the Cochran thinner to thin to nine inches, and cleaned it up for $18.00 per acre (at a $1.25 per hour rate).

Gularte Bros. planted at a 2.1″ spacing; thinned 43 acres with the Cochran thinner, and cleaned up the weeds for $17.00 per acre (at a $1.25 per hour rate). Then it rained and Gularte Bros. finished thinning the field by hand at $1.25 per hour. It cost over $50.00 per acre for the remaining 7 acres.

The photos below were taken on Gularte Bros. ranch to show an example of the work done by the Cochran thinner.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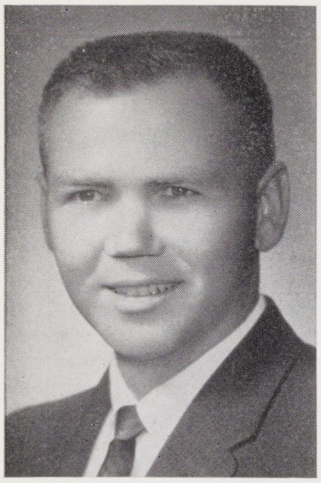
LEFT—Seedlings from Gularte Brothers planting; 2.1-inch seed spacing. RIGHT—Seedlings left by the Cochran Thinner; 7 singles and 1 double.

GERALD NORDSTROM — MENODTA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Since the grower's primary objective in raising sugar beets is to realize a profit, he must minimize his inputs and maximize his output in such a way that he can receive the greatest possible net return from his crop.

There are many management tools which the grower can utilize to achieve this maximum profit objective, and one such tool is the nitrogen strip technique. This systematic method of determining the nitrogen requirements of a given crop is being used more and more by growers in my district. Even seasoned sugar beet growers in the area are using the method after observing many of the new growers making very effective use of them.

One objective shoud be kept in mind when considering the fertilizer program; the amount of nitrogen that will produce the most sugar per acre at the least cost.

The nitrogen strip technique can be utilized in determining an optimal rate in two ways. It can be used as "hindsight", so to speak, by sampling and comparing each rate of nitrogen on a net dollar return basis.

The other way in which it can be used would be to make a "guesstimate" as to what the opitmal rate of nitrogen should be. This foresighted method of estimating nitrogen requirements is done by observing the strips at regular intervals and watching for any nitrogen deficiency symptoms among the various rates and determining how much additional nitrogen, of any, would be applied as a sidedress.

The strip technique is a unique management tool in that it does incorporate both hindsight and foresight.

The strip technique should be tailored for each field involved. While the strips are in the field, observe how they can be used in estimating an optimal rate for that field. Chances are that if the strip is set up and interpreted properly, it will become a part of the normal cultural operations. Bear in mind that the technique is not a time consuming and costly operation. It can be carried out as a normal operation, and the benefits that accrue from its use far outweigh the small amount of effort expended upon it.

Editor's Note: The last issue of the BULLETIN (Vol. 29, No. 2, p. 10) carried a comprehensive article by Spreckels Agronomist Laurn Beutler which thoroughly covered this very important subject of Nitrogen management.

NEW RULES FOR NEMATODE CONTROL

DURING THE MONTH of March this year the eight California counties of the San Joaquin Valley adopted a uniform policy in an effort to prevent the spread of the sugar beet nematode (*Heterodera schachtii*). Prior to the adoption of these restrictions on the movement of farm implements, machinery, trucks and other appliances between counties, the Agricultural Commissioners of these counties met and discussed this problem between themselves and members of the industry. From these meetings the restrictions embodied in the State Department of Agriculture Q. C. Circular No. 7 were developed. The rules which apply to San Joaquin Valley Counties are printed below.

COUNTIES OF FRESNO, KERN, KINGS, MADERA, MERCED, SAN JOAQUIN, STANISLAUS AND TULARE

Sugar beet cyst nematode has caused severe losses to sugar beet growers in other areas of California. Once established there are no known practical eradication methods for this pest.

Because of the rare known occurrences of this pest in San Joaquin Valley, because of the serious nature of the nematode, and because the sugar beet industry is one of the important economic segments of San Joaquin Valley, the above named counties find it necessary under authority of Sections 122, 126 and 127 of the California Agricultural Code and Section 3555 of the California Administrative Code, to establish certain controls as shown below:

RULES GOVERNING THE MOVEMENT OF ANY FARMING IMPLEMENTS AND MACHINERY AND FIELD EQUIPMENT, TRUCKS, TRACTORS OR OTHER APPLIANCES WHICH HAVE BEEN USED OR OPERATED IN CULTURING, HARVESTING OR TRANSPORTING SUGAR BEETS.

1. **All such equipment shall be held for inspection upon arrival in any of the above named counties for use therein, and shall not be used until inspected and released by the County Agricultural Commissioner, or his Inspector, in the county of destination.**
2. **All such equipment will be inspected and released if:**
   - **a. Accompanied by a certificate signed by the Agrlcultural Commissioner or his Inspector at origin stating that such equipment has not previously been used in an infested area, or**
   - **b. Certified by the Agricultural Commissioner or his Inspector at origin as having been thoroughly cleaned and free of all soil and debris immediately prior to entry into any of the above named counties, or**
   - **c. Free of all soil and debris immediately prior to entry into, and upon arrival at destination within, any of the above named counties.**
3. **All such equipment found contaminated with soil and debris, and not certified as in 2, a. above:**
   - **a. May be refused entry into any of the above-named counties, or**
   - **b. Shall be treated at the owner's expense in the destination county immediately upon arrival under the supervision of, and to the satisfaction of, the destination county's Agricultural Commissioner or his Inspector. The location of said cleaning operation shall be designated by the Commissioner.**

While the preceding regulations represent a major step in controlling, delaying and/or impeding the spread of sugar beet nematode between counties, the greatest contribution that can be made to prevent increasing nematode damage within the county is that of the individual farmer. He is the key figure in the prevention of nematode spreading from one field to another within the county borders.

Spreckels Sugar Company applauds the timely action of these county Agricultural Commissioners. We also urge all sugar beet growers to establish similar restrictions on sugar beet equipment employed on their farms.

THE MITE PROBLEM

Continued from Page 21

CONCLUSIONS

Although it was not possible to reach definite conclusions from the data obtained in the 1964 trials, this work did focus our attention on several questions of considerable importance. The first which might be posed is the obvious point concerning total effect on photosynthetic rate, i.e., what effect on growth, sucrose production, and maturation might be expected when severe damage to 60 to 90% of the plant's total leaf surface occurs? This is especially significant if one considers that this may well occur when the plant has attained good root size for maximum growth potential during early to mid-summer. The second, and definitely more subtle effect which might be considered concerns nutrient uptake by the plant and its ultimate influence on sucrose yields, i.e., if total plant metabolism is significantly reduced during the most important growth period, what effects on nitrogen uptake and resultant nitrogen residue might be expected? The third point which must be considered in our future experiments is emphasized by the fact that mite control programs in other crops are most frequently based on treatment prior to any obvious buildup or damage. Are we, therefore, by attempting these late treatments, trying to lock the barn door after the horse has escaped?

All of these, and many other, questions serve to illustrate the fact that much research remains to be done on this matter. It is my hope that both the entomological aspects of these problems may be fully explored so that we may, in time, be able to say with certainty what damage may be attributed to this pest species in sugar beets and what measures may be taken to protect the crop from it.

HESSTON ACQUIRES GEMCO, INC.

THE PHYSICAL ASSETS OF Gemco, Inc., of Ogden, Utah have been purchased by Hesston Mfg. Co., Inc. of Hesston, Kansas. (The Gemco name is not included in the transaction.)

Well known for their line of hay tools (windrowers and swathers) Hesston will now offer sugar beet harvesters, presumably the present Gemco line.

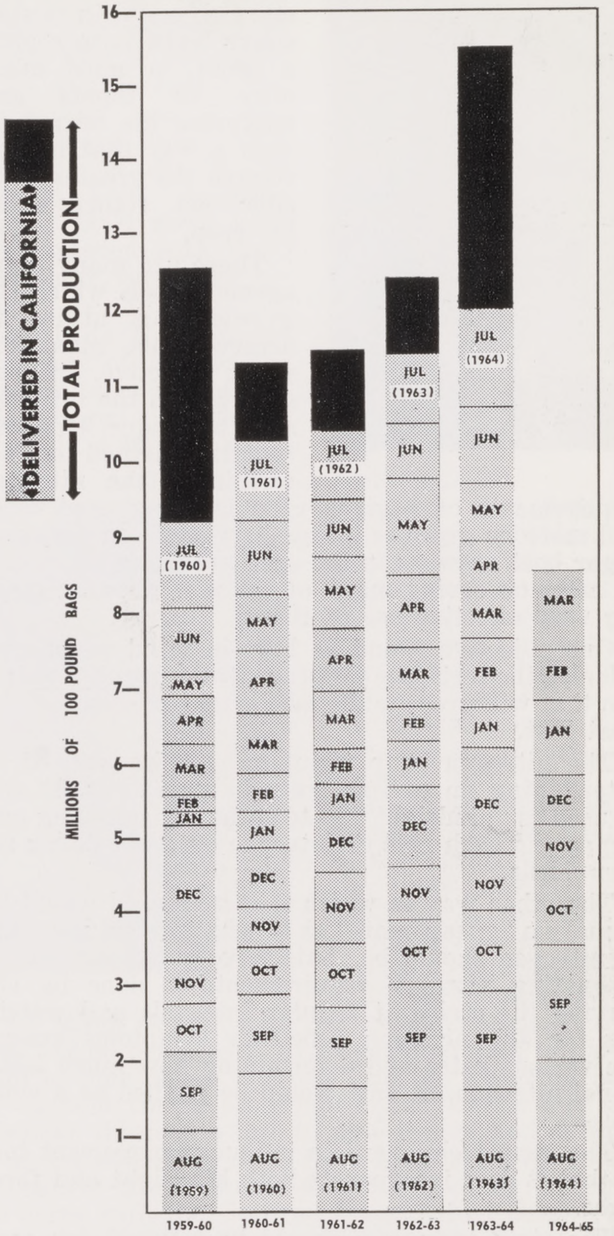
As a matter of interest, much of the sugar beet seed produced for Spreckels growers is harvested with special Hesston windrowers equipped with vertical cutter bars.

SPRECKELS SUGAR BEET BULLETIN is issued bi-monthly by the Agricultural Department of Spreckels Sugar Company as a service to its growers. Mention of specific methods, devices and implements does not constitute an endorsement by the Company. All photographs by the editor unless otherwise indicated.

AUSTIN ARMER, EDITOR
SPRECKELS SUGAR COMPANY WOODLAND, CALIFORNIA

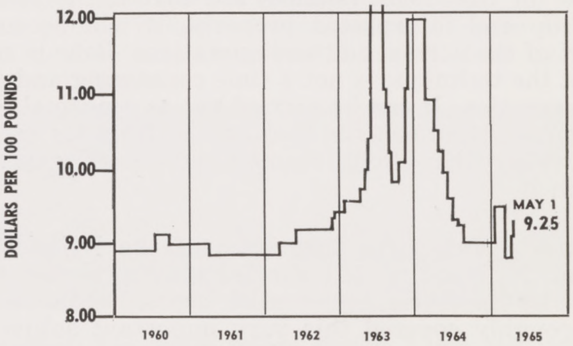
PRODUCTION AND DELIVERIES OF BEET SUGAR

Sales Year – August 1 to July 31



QUOTED PRICE OF BEET GRANULATED SUGAR

In 100 Lb. Paper Bags, F.O.B. San Francisco



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PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

SPRECKELS SUGAR BEET BULLETIN

VOL. 29 JULY-AUGUST, 1965 NO. 4

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WHAT DOES ONE WEED COST?

Plenty — to the sugar beet competing with it. Hand pulling of weeds when cultivation is no longer possible is good business — See page 26.

HOW MUCH DOES ONE WEED COST?

By JACK BRICKEY, Agronomist
Spreckels Sugar Company

ONE OF THE PROBLEMS confronting many sugar beet growers each year is whether or not it is economical to pull large weeds which appear above the beets in mid season. This problem is most common with spring planted beets which emerge at about the same time as summer weeds, such as redroot pigweed, lambsquarter and watergrass. These weeds are in direct competition with the beets from an early stage; they are missed at thinning time and at the first hoeing. Depending on the quality of the weeding job done at thinning time, large weeds of many varieties may become apparent in the field a month or so later.

Often it is obvious that these weeds must be pulled, since their high population is a self-evident source of competition with the beets for nutrients, light and water. But when there is a light stand of weeds the question is often asked—"How much are they costing me?" With increasing labor costs, growers are less concerned about the appearance of the field than they are about the net returns from the sugar beet crop.

In an attempt to evaluate the effect of a weed population on the sugar beet yield in 1964, a field was selected which had a weed population of about 30 weeds per 100 feet of row. The weeds were primarily redroot pigweed with some lambsquarter and watergrass. The field had been planted in early May and thinned in June to a stand of about 100 beets per 100 feet of row. In mid July the grower was hand-pulling the large weeds at a cost of $23.00 per acre. At this time it could be seen that these weeds had been missed at thinning time, for some rows were relatively clean and the other heavily infested, signifying the varied efficiency of the hand thinners.

Several rows of this field were marked off and replicated plots designed. One treatment was left as it was; one treatment had approximately one-half the weeds pulled, and another had all of the weeds pulled. No further weeding was performed after this operation.

The results of this test when harvested on February 26, 1965 were as follows:

	Tons Beets per Acre	Tonnage Reduction	Loss per Acre
No weeds	34.4	—	—
One weed for 6 beets or 17 weeds per 100 feet	31.5	2.9	$36.68
One weed for 3.3 beets or 30 weeds per 100 feet	29.6	4.8	$60.72

There was no measured effect of the weeds on sugar percentage, but a costly reduction in beet yield was indicated.

The loss of 4.8 tons to the acre amounts to a reduction of approximately $60.72 in gross income. When the cost of pulling the weeds is considered at $23.00 per acre as well as the additional harvest and hauling costs, the grower netted about $29.30 per acre by pulling all of the weeds.

When the weed population is only one weed for every six beets, there is still $8.60 to be gained, even at a cost of $23.00 per acre.

Calculations from each of these populations indicate that each weed reduces the gross income of the grower by slightly more than 1 cent. This does not take into consideration the spread of weed seed, the difficulty of harvest, and the trashy loading which these weeds generate when left to maturity.

Needless to say, the best time to rid the field of weeds is before they are established. Proper usage of pre-emergence weedicides, in-the-row spring tine weeders, and mechanical thinners can eliminate nearly 100% of the weeds. But too often the first moisture available to a beet crop comes three to four weeks after the application of weedicides, when there is very little activity remaining.

Cultivations must be timely, and bed preparation for spring tine weeders must be planned well in advance as insurance against late-emerging weeds.

It might be well to bear in mind that for each weed left in the field, a bright new penny has been lost forever.

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THESE ARE EXAMPLES of the often-neglected "Solitary Weed." They escape the field's last hoeing, and by harvest time have grown to alarming size and in sufficient numbers to seriously impair yield.

IRRIGATION PRINCIPLES STATED IN 1937 ARE STILL RECOMMENDED

By LAUREN BURTCH, Chief Agronomist
Spreckels Sugar Company

FOREWORD: George P. Wright started his sugar beet career as a field superintendent in Colorado in 1910. He ended his career 48 years later after serving as District Manager of both the Sacramento and Salinas districts of the Spreckels Sugar Company. Mr. Wright was one of the front line participants in the long battle to save the beet sugar industry from the menace of Curly-top and the many factors that threatened its survival during his career.

It is fitting that the very first issue of the SPRECKELS SUGAR BEET BULLETIN (May, 1937) featured an article concerning sugar beet irrigation written by Mr. Wright, and it seems particularly appropriate in our jet age days of moon shots and spacemen to review the principles of sugar beet irrigation as outlined in 1937 by Mr. Wright. His article is here quoted.

McCurry Photo 53
MR. GEORGE P. WRIGHT in 1937

"The proper use of irrigation water is probably the most important factor in growing a successful crop of sugar beets. Irrigation starts after a large part of the money involved in beet growing has been spent. Therefore, there can be no recovery from an irrigation job poorly and carelessly done. Poor seed beds can be remade; poor stands can be reseeded; poor thinning jobs can be retouched; poor cultivation can be corrected by later cultivations. There is no correction for careless irrigation.

"Preparation for successful irrigation must start with preparation of the land and irrigation must be kept in mind throughout the plowing, seed bed preparation and cultivating season. The secret of successfull irrigation is based entirely upon the penetration of water into the soil in quantities sufficient to promote growth at all times without endangering the plants by scalding and root rot.

"The sugar beet is a deep rooted plant, the roots penetrating the soil to a depth of six feet and feeder roots occupying the entire soil area to this depth. It is of great importance, therefore, that moisture be available for the plant to a depth of six feet. The ideal condition occurs when by testing the soil in a beet field, the moisture content increases from practically zero at the surface to the water holding capacity at six feet. This is the condition for which the grower must strive. It is the only condition under which maximum yields can be grown. The successful grower will be as much concerned with the moisture condition of his field from the second to the sixth foot of soil as from the surface to the second foot.

"A field of growing sugar beets is similar to a huge pump. Irrigation is applied to the land by the roots up through the leaves and passes off into the air. This process goes on from the time the beets have emerged until they are harvested. The grower's job is to keep sufficient supply of water in his field at all times in order to keep this circulation of moisture in proper balance."

Mr. Wright then listed 10 rules for sugar beet irrigation which apply to all conditions of soil and climate. Let's review these in terms of 1965:

1. *"The theory that beets can be made to go down for water by withholding irrigation was exploded years ago"*. How many times do we hear this same poor excuse given for dry beets in 1965?
2. *"Do not delay irrigation until plants are wilted before applying water"*. This one practice generally keeps good yields from becoming outstanding yields.
3. *"Make short runs on sandy lands 400 feet, on heavier lands 600 feet"*. In 1965, we would gratefully settle for reducing all ½ mile runs to ¼ mile runs.
4. *"Keep irrigation water in furrows. Do not practice flood irrigation"*. This is one practice that has been almost universally accepted. Now we need to be certain that we provide an adequate furrow for good water control at the time of last cultivation. When furrows do become choked with weeds and by erosion, the jet-age grower doesn't hesitate to remake them in mid-summer.
5. *"Be particularly certain that penetration of water for the first irrigation is not less than six feet in depth and maintain the sub-moisture throughout the growing season"*. This is one of the most important principles of sugar beet

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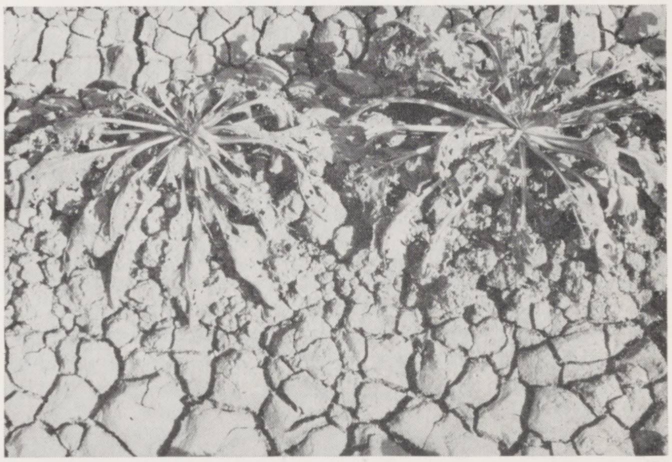
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POOR IRRIGATION practices are as damaging to the crop today as they were 28 years ago; but the damage costs more now.

irrigation in 1965 as well as in 1937.

It has been demonstrated many times by outstanding beet growers as well as in irrigation experiments, that once beets have exhausted moisture from lower levels, rarely, if ever, can this moisture be replaced by subsequent irrigations.

6. *"Proper irrigation increases sugar content of beets. Constant growth of the plants gives maximum sugar content. Any retarding of growth during the season lowers sugar content"*. If we consider 'sugar content' as total sugar production then this statement is just as up to date in 1965 as in 1937. SUGAR CONCENTRATION CAN BE INCREASED BY WITHHOLDING MOISTURE, BUT DEHYDRATION EXCEPT IN ANTICIPATION OF HARVEST RESULTS ONLY IN A REDUCTION IN TOTAL SUGAR PRODUCTION AND HENCE A LOWER GROSS RETURN FROM THE CROP.
7. *"If wilted beets fail to revive overnight they have stopped growing and immediate irrigation is necessary"*. Fortunately, this condition is not encountered in 1965 as often as it was in 1937. The avoidance of this condition in the crop just harvested was one of the principle reasons why the Woodland district averaged over 22 tons per acre in 1964 compared with 14 tons per acre in 1936.
8. *"A dark green color of beet leaves is the first indication of a lack of ground moisture"*. The obvious comment at this point is how many of us watch our fields closely enough in 1965 to detect color differences in the foliage as moisture levels drop.
9. *"Do not irrigate by the calendar. Soil conditions and weather conditions are the proper indicators"*. Ideally this is still correct, however, with larger acreages and more pressure on irrigation systems and people to run them, the calendar seems to be the most practical 1965 solution for producing the most profitable sugar beet crop under most farming conditions. Our experiments in the Central Valley have demonstrated that an irrigation schedule from June 1 to August 15 calling for irrigation at intervals of 12 to 16 days on heavy soils and 7 to 10 days on light soils should be sufficient for maximum production even during extreme temperature periods.
10. *"Use a soil auger before and after each irrigation—before, to determine the amount of water needed to fill the soil ot water holding capacity, and after, to be certain that this has been done"*. It's too bad that we are all too busy to still do this in 1965, for I am sure we'd all know a great deal more about the moisture condition of our sugar beets if we could check that field with the auger once in a while during the season.

The basic principles outlined so clearly many years ago by Mr. Wright are still new and fresh. Perhaps we need to look back once in a while so that we may clearly see the best way to move forward.

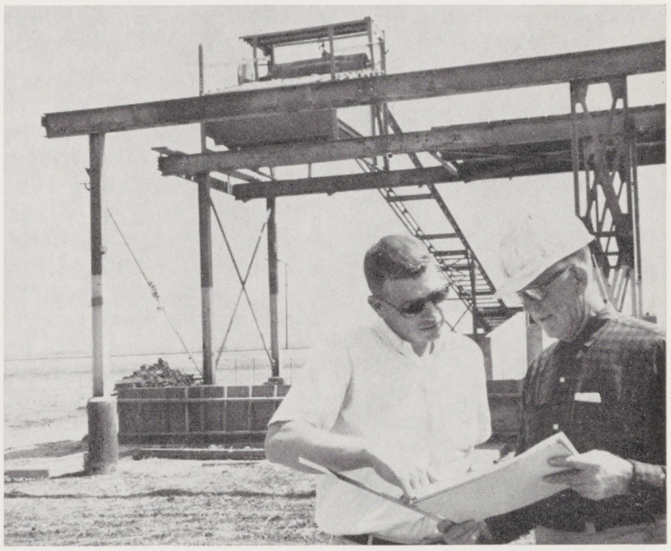
NEW BEET LOADING STATION WILL SERVE GILROY-HOLLISTER AREA

A COMPLETELY NEW beet receiving facility is approaching completion on the Gilroy-Hollister road (Bolsa Road), about 3 miles southeast of U.S. Highway 101.

Beet growers' trucks will be dumped with greater speed than was possible at either of the Gilroy or Hollister stations, which the new Bolsa station replaces. Weighing and sampling of beets will be speeded up, still further reducing growers' delivery time.

Clean beets can be delivered to either rail cars or transport trucks, with negligible time required to make the change-over.

Bolsa station will be completed in time to receive beets at the beginning of the 1965 Fall harvest.



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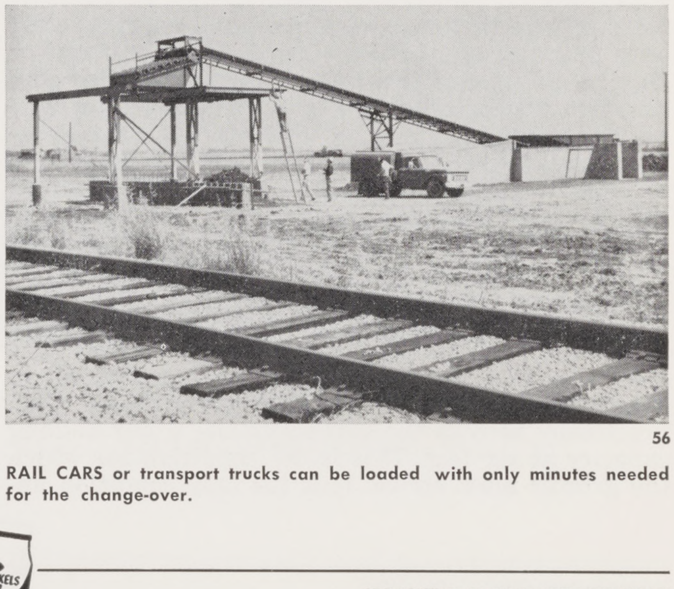
J. NORMAN DAWE, Field Superintendent confers with Hamp Baldwin, Construction Foreman, as the new Bolsa receiving station takes shape.



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RAIL CARS or transport trucks can be loaded with only minutes needed for the change-over.

The 1964 Honor Roll

Spreckels sugar beet growers have shattered all records. The Honor Roll includes far more names than ever before, even though the District 1 list, in accordance with past policy, shows no yields under 30 tons per acre. (The average yield for the entire Spreckels District was 27.02 tons per acre.)

We call your attention to the listing of names in descending order of "Pounds of Sugar per Acre." This new arrangement eliminates no name from the Honor Roll as it has previously appeared, but gives recognition in relation to the true merit of sugar beet crop production —sugar per acre.

DISTRICT 1 — SPRECKELS

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Merrill Farms	10	38.53	12,715
Steve Pervetich	9	41.35	12,686
Frank Taylor	98	43.04	12,516
Dean Pryor	57	39.14	12,360
Owen T. Rice & Son	91	40.74	12,352
Jim Fanoe & Son	55	40.87	12,253
John DeCarli & Son	18	43.62	12,144
Foster Hutchings	23	39.12	11,932
Ernest J. Homen	10	37.12	11,840
Roy Sakasegawa	21	41.23	11,817
J. L. Whitney & Son	10	40.49	11,807
San Vicente Ranch	74	37.01	11,806
Paul B. Tavernetti	18	37.62	11,775
Silveria Bros.	44	41.35	11,760
West Coast Farms	21	36.36	11,759
Salaberry & Guidici	71	34.92	11,677
Bassetti Bros.	15	38.79	11,649
Harry R. Semas	35	40.53	11,648
West Coast Farms	21	36.50	11,607
Hansen & Fowler	93	36.74	11,538
James M. Johnsen	33	38.07	11,535
Dean Pryor	40	34.77	11,495
Dean Pryor	40	34.81	11,487
B. E. Johnson	50	37.68	11,485
Porter Berry Farm	31	35.01	11,385
Kenzo Yoshida	7	35.26	11,382
Jack A. Hayes	53	37.64	11,367
Bruce Church, Inc.	31	35.47	11,343
Owen T. Rice & Son	15	36.50	11,322
Arthur F. Blomquist	43	36.53	11,273
Henry Signorotto	20	38.04	11,240
West Coast Farms	27	37.58	11,191
John G. Anderson	30	33.37	11,153
William J. Soares	27	27.60	11,144
A. F. Silveira & Sons	20	35.55	11,077
Mine Bros.	32	41.85	11,007
Ichikawa Farms	29	34.65	10,956
Embrey & McKinley	42	33.47	10,905
Robert A. Johnson	30	37.25	10,892
Dean Pryor	63	37.24	10,889
Wiley Farms, Inc.	60	35.61	10,868
J. F. Keough	33	33.89	10,865
Mortensen Bros.	60	35.00	10,843
John DeCarli & Son	6	39.35	10,813
W. D. Crinklaw	73	36.26	10,813
Tony Homen, Jr. & Son	27	30.74	10,796
V. Vanoli & Son	24	37.88	10,765
Peter Biskup & Sons	20	38.30	10,739
John DeCarli & Son	7	37.00	10,730
Jesse G. Homen	66	35.24	10,720
W. W. Johnson & Son	99	33.90	10,658
John & Bob Corda, Jr.	16	34.66	10,641
West Coast Farms	16	33 73	10,638
E. John Nielsen Co.	75	32.84	10,634
Tognetti & Fillipelli	40	35.47	10,620
G. W. Herbert & Son	72	33.84	10,619
Harless Bros.	19	34.81	10,589
Louis Ferrasci	16	33.84	10,572
California Orchard Company	69	33.38	10,557
W. D. Crinklaw	418	31.78	10,557
Henry E. Corda	22	31.74	10,550
John Gardoni	26	32.68	10,534
Gill Bros.	52	35.73	10,526
Lawrence Silva	42	31.94	10,483
Edwin Thorp	19	35.81	10,478
Arrow Lettuce Co.	56	33.51	10,469
Martinus & Martinus	60	32.40	10,459
Raymond Martin	187	35.27	10,447
Robert A. Smith	16	36.17	10,395
Toro Farms	32	32.67	10,383
Edward A. Johnsen	20	35,57	10,365
Baggiolini Bros.	16	33.51	10,314
Arrow Lettuce Co.	53	31.08	10,281
Growers Produce Dispatch	22	39.54	10,272
W. M. Sullivan	56	32.26	10,259
Martella & Buzzini	36	32.99	10,247
A. F. Silveira & Sons	18	31.68	10,245
Edward J. Lemos	25	30.48	10,217
Growers Produce Dispatch	57	35.43	10,140
Gilroy Produce	35	29.92	10,131
Ernest R. Binsacca	30	33.18	10,120
Herold Ranches	96	33.11	10,118
H. F. Trafton & Son	49	30.77	10,111
Kenzo Yoshida	66	31.77	10,103
Norman & Roy Recht	18	29.53	10,091
Franscioni & & Griva, Inc.	41	34.95	10,080
J. E. Blair	10	39.42	10,060
Fremont Farms	42	31.98	10,042
M. S. Stolich	18	33.20	10,040
Ambrosini & Pisoni	24	36.41	10,035
McKinley & Nevin	30	34.12	10,024
Latasa Bros.	61	31.02	10,007
Morisoli Farms, Inc.	25	32.84	9,984
Frank Taylor	45	35.03	9,977
The Garin Company	116	35.23	9,970
C. L. & A. W. Johnson	73	30.52	9,950
Twisselman & Roper	96	33.05	9,898
Growers Produce Dispatch	13	35.75	9,881
Robert A. Smith	21	37.32	9,875
Albert C. Hansen, Jr.	58	32.58	9,865
H. & E. Christensen	20	30.33	9,863
Fanoe Bros. & Sons	32	31.62	9,859
Tondre Alarid	28	31.87	9,854
Nunes Bros.	23	31.17	9,831
Jim Fanoe & Son	138	31.83	9,823
Maynard H. Frudden	8	35.15	9,807
F. J. Martin	31	31.59	9,806
Nunes Bros.	30	30.83	9,748
Silveria Bros.	34	30.55	9,739
West Coast Farms	5	35 31	9,710
Roy W. Johnson	37	33.22	9,707
Tognetti Bros.	73	31.67	9,678
Raymond Martin	247	31.39	9,637
A. F. Silveira & Sons	20	30.40	9,631
California Coastal Farms, Inc.	62	31.29	9,625
Wyman Farms	19	32.45	9,605
Paul G. Milladin Fruit Co.	10	30.33	9,590
A. J. Glau & Son	50	32.60	9,584
Louie Manzoni	18	31.26	9,578
Joe E. Panziera	21	35.72	9,570
James H. Watson	21	31.24	9,497
Arcotti Bros.	25	30.57	9,458
Toro Farms	59	31.63	9,445
Yamaoka Bros.	13	40.77	9,426
Breschini Company	11	34.70	9,425
Vosti Bros.	22	33.64	9,406
Elmer Johnsen	82	30.46	9,388
Botelho Bros.	15	30.43	9,330
Linc & Ben Handley	32	30.98	9,280
Nunes Bros.	30	33.69	9,278
Nunes Bros.	50	30.08	9,253
Clark & Romans	79	31.58	9,240
Peter A. Stolich Co., Inc.	93	31.09	9,234
Chas. Gianolini	33	31.61	9,199
Botelho Bros.	22	30.15	9,196
Obata Bros.	38	32.25	9,172
Pete Fanucchi	50	31.97	9,137
T. G. Bacciarini	42	31.03	9,123
J. A. Ferrasci	26	40.45	9,093
Martinus & Martinus	41	30.16	9,018
D. H. Wynne	99	31.71	8,993
Alvin L. Noll	61	30.81	8,990
B. & M. Farms	29	30.07	8,955
J. J. Crosetti	62	31.98	8,858
Fujii Bros.	14	30.68	8,817
Chas. Morgantini & Son	24	31.85	8,810
Lemos Bros.	40	31.00	8,650
Peter A. Stolich Co., Inc.	63	35.67	8,611
Frank Wyrick	22	30.30	8,551
W. & S. Packing Co.	37	31.55	7,881
Merit Packing Co.	15	35.24	7,859
Rossi Bros.	77	31.64	7,372
Obata Bros.	33	31.22	7,193
De Francesco Bros.	56	33.14	6,031

DISTRICT 2 — MANTECA

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Tony A. Sanchez	33	35.83	11,509
Manuel L. Costa	98	33.03	10,827
Uyeda Bros.	42	34.75	10,793
Dexter Bros.	89	31.86	10,635
Frank Giannecchini	56	35.64	10,599
Geo. Tomura	15	35.03	10,593
A. Pellegri & Son	60	33.36	10,301
Lester Rodgers	52	34.35	10,229
Alvarez Bros.	120	33.05	10,087
Ronald Ohm	64	32.07	10,044
Henry Arata	23	31.32	10,029
Robert Norman	23	33.85	9,938
Enrico Pizzi	12	34.48	9,937
Jory Bros.	70	35.68	9,905
James Hatch	105	36.24	9,886
Jimmie T. Nishida	24	33.82	9,869
Lester Rodgers	56	32.61	9,822
Carmel Mejia	72	34.42	9,810
A. Pellegri & Son	41	31.67	9,748
H. C. Baumgartner	78	32.87	9,710
Joe Garsino	10	33.73	9,680
James B. Rodgers	18	32.20	9,673
Robertson & Sons	63	30.29	9,638
Theodore R. Baskette	76	34.87	9,589
San Julian & Zabalza	120	31.55	9,579
M. C. Thorkelson & Co.	104	34.31	9,579
Calcagno Farms	62	35.06	9,571
Merlin Miller	154	29.98	9,558
Enrico Pizzi	6	29.58	9,537
J. & R. Solari	43	31.65	9,514
A. Pellegri & Son	40	31.23	9,506
Steve Galanti	89	31.62	9,473
Kiyoi Bros.	113	32.35	9,466
Donald R. Westbrook	43	31.44	9,463
Stuart Clever	36	30.84	9,462
Uyeda Bros.	12	32.26	9,459
Al Fonseca	71	29.44	9,409
Calcagno Farms	26	35.01	9,376
Clarence Nilsson	75	29.22	9,327
Paul A. Johnson	28	30.51	9,281
Nat Bacchetti	27	30.50	9,272
Westing and Son	90	30.52	9,247
Theodore R. Baskette	98	30.17	9,238
John & Robert Bogetti	70	29.92	9,233
John L. Miller	45	30.57	9,153
Victor Schiaffini	66	34.42	9,135
Joe Garsino	10	30.68	9,094
Dasso Bros.	53	31.79	9,092
Lovegreen & Wilson	63	34.04	9,082
Tony A. Sanchez	33	28.89	9,025
Robert Norman	179	27.76	9,016
John & Robert Bogetti	54	27.00	9,013
Joe Toste, Jr.	55	28.59	8,977
Tony A. Sanchez	131	29.08	8,951
Lucio J. Costa	84	25.40	8,890
A. Pellegri & Son	76	28.67	8,859
Enos & Woodward	135	28.46	8,823
Ishida Bros.	33	31.22	8,798
Enos & Woodward	24	27.09	8,788
Uyeda Bros.	40	29.27	8,769
Edward Maberto	86	29.31	8,728
George B. Lagorio	72	28.35	8,698
D. & A. Togninali	63	27.85	8,678
Frank Raspo	52	31.18	8,649
Murata Bros.	68	29.09	8,675
Lino Bozzano	20	27.96	8,640
Westing & Son	72	28.92	8,624
Wm. H. Fisk, Jr.	82	27.64	8,585
S. & D. Farms	20	29.66	8,572
Enos & Woodward	54	26.40	8,559
A. L. Lagorio	48	29.93	8,554
George Mitsuda	98	28.55	8,519
Al Fonseca	105	29.09	8,459
George B. Lagorio	107	28.53	8,456
Jimmie T. Nishida	25	28.14	8,442
Manuel Amaral, Jr.	50	27.46	8,419
R. & J. Dondero	71	29.12	8,416
Tower & Son	32	31.67	8,411
Harlan E. Neer	102	27.13	8,405
Lovegreen & Wilson	118	29.12	8,392
Jack Kimoto	122	30.02	8,381
Tony A. Sanchez	76	28.91	8,338
Hanson & Barkley	45	28.39	8,330
Tony J. Pereira	72	28.35	8,329
Lauri Filippini	54	27.63	8,322
David Vana	33	27.12	8,272
R. E. Thorsen	70	27.85	8,238
Raymond Owning	147	28.09	8,230
Grant & Wilson	119	25.31	8,226
Perry Farms	54	31.43	8,209
D. E. Kaufman	55	27.62	8,198
Bogetti Bros.	48	28.12	8,172
Tanaka Farms	293	29.16	8,171
K. Sasaki	47	25.78	8,167
Lara Farms, Inc.	89	26.81	8,150
Ishida Bros.	105	29.95	8,134
Perry Farms	43	25.53	8,134
Christ Bacchetti & Son	37	26.51	8,128
James Craven	60	28.17	8,096
M. C. Thorkelson & Co.	41	29.65	8,071
Henry Arata	44	26.25	8,064
Richard A. Mettler	39	26.05	8,049
Donald R. Westbrook	51	27.48	8,046
Melvin A. Baumbach	220	25.76	8,032
Geo. F. & Chas. O. Hansen	20	26.45	8,014
Paul A. Johnson	6	26.80	8,013
Ishida Bros.	60	27.24	7,998
Giudo Biagi	55	26.35	7,995
H. Ehlers & Sons	74	25.55	7,992
Donald Fink	12	26.42	7,968
Rene Andersen	49	27.51	7,956
Bill Burgess	96	27.19	7,934
Lyons Bros.	76	27.18	7,926
Sakakura Farms	40	25.84	7,917
Richard C. Medeiros	129	25.23	7,887
Henry L. Rodgers	60	27.12	7,886
Gambini & Sons	77	26.21	7,879
John Kautz	100	29.32	7,852
Nobuo Sakamoto & Son	120	25.05	7,851
John L. Bertaina	47	25.64	7,805
Tony A. Sanchez	115	28.25	7,774
Garry Leroy Fisk	10	26.91	7,745
Nobuo Sakamoto	41	26.26	7,736
Thomas E. Alderson	135	30.09	7,727
Bogetti Bros.	124	27.61	7,714
Grant & Wilson	88	25.14	7,708
M. C. Thorkelson & Co.	13	27.05	7,688
Calcagno Farms	17	26.34	7,681
Frank Ormonde	55	25.13	7,675
Thomas E. Alderson	39	27.55	7,675
Sousa Bros.	47	25.75	7,663
George B. Lagorio	146	28.33	7,632
Nunes & Verhaegen	30	26.62	7,613
Frank Fialho	27	26.46	7,578
Uyeda Bros.	18	25.94	7,564
Henry Fisk & Son	196	27.37	7,554
Anna Garsino	5	26.17	7,542
Joe Ratto, Jr.	85	27.42	7,540
Arnaudo Bros.	30	26.27	7,518
Narducci & Son	144	25.60	7,501
Caminata & Podesta Farms	76	28.39	7,489
H. Ehlers & Sons	278	26.94	7,479
Joe A. Silva	29	28.55	7,452
Grant & Wilson	54	28.05	7,444
Tony A. Sanchez	57	27.92	7,427
D. & A. Togninali	74	25.35	7,412
Bogetti Bros.	59	25.11	7,412
Fred Fukano	120	28.88	7,370
Hanson & Barkley	125	26.33	7,367
Jory Bros.	79	26.40	7,339
R. E. Thorsen	74	25.13	7,328
Calcagno Farms	72	29.78	7,308
Sousa Bros.	73	26.69	7,222
Sousa Bros.	154	26.46	7,218
Kaiser & Lindeman	269	26.01	7,210
S. Mizuno & Sons	77	27.65	7,134
Calcagno Farms	250	25.13	7,107
Rolf Brunswick	102	26.87	7,099
James A. Luis	166	24.92	7,032
Sakakura Farms	110	25.95	7,017
M. Kagehiro	57	26.34	7,017
Cerutti Bros.	47	25.67	6,992
Maciel Bros.	160	25.87	6,886
A. Pellegri & Son	53	26.93	6,668
Kolding Bros.	65	26.31	6,583
Maciel Bros.	89	25.57	6,577
Ishida Bros.	29	26.29	4,748

DISTRICT 3 — WOODLAND

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Joe Gnoss, Jr.	71	36.36	11,380
Heidrick Bros.	91	37.07	11,306
Meek & LeMaitre	65	41.32	11,140
Heidrick Bros.	48	35.82	10,890
Ernest J. Weyand	22	31.85	10,784
Holdner & Weigand	102	35.54	10,726
Van Smith	104	35.41	10,369
Heidrick Bros.	231	33.31	10,272
Wm. A. McDonald	65	33.49	10,214
Edgar Everett	74	31.59	10,166
Solano Farms Corp.	51	29.95	10,142
George M. Struve, Jr.	172	33.78	10,134
L. L. Leonard	18	32.07	10,114
Dan G. Best	30	37.70	10,112
Van Smith	57	36.48	10,032
Giannoni Bros.	74	33.03	9,876
Heidrick Bros.	120	33.61	9,640
Ralph Moss	23	28.70	9,620
Buchignani & Hughes	97	33.04	9,582
Haussler Bros.	55	29.63	9,576
Alvin J. Hermle	24	29.49	9,532
Paul Stephens & Son	28	31.83	9,518
Edgar Everett	74	33.85	9,430
Robert C. Schulze	169	31.83	9,422
Meek & LeMaitre	71	30.87	9,434
Dan G. Best	45	36.91	9,376
Heidrick Bros.	271	29.16	9,360
Jimmy Leong	72	30.11	9,358
Ernest J. Weyand	18	28.12	9,352
Chew Bros.	194	29.92	9,300
J. L. McClish	91	29.90	9,293
Solano Farms Corp.	31	29.69	9,204
Chew Bros.	87	28.59	9,184
Orth Bros.	35	29.65	9,168
Chew Bros.	82	31.02	9,157
Carl Hahn	244	31.00	9,152
Giannoni Bros.	136	32.02	9,152
C. Warren Sievers	22	32.99	9,152
J. H. Braden	37	31.10	9,144
John M. Lear	20	29.40	9,120
C. Warren Sievers	53	31.39	9,072

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
M. B. Avilla	74	29.22	9,052
Chew Bros.	75	27.28	9,052
Eldred R. Reel	192	30.29	9,026
M. & T. Farms	25	32.79	9,024
M. B. Flores	74	31.30	9,014
Wilson Lovvorn	78	29.23	9,002
R. R. Peters	42	28.56	9,002
Kenneth Snyder	38	30.23	9,002
John E. Jackson	34	29.73	8,990
Wilson Lovvorn	36	28.03	8,974
Donald Fong	32	31.01	8,974
Leroy Leonard	73	30.77	8,936
Ernest Dietrich	69	27.75	8,914
Frazier & Sandoval	42	29.56	8,910
Sagara Bros.	104	30.49	8,904
Alfred W. Cruickshank, Jr.	31	30.90	8,886
George T. Dakuzaku	40	30.59	8,884
Ted Mata, Jr.	22	26.97	8,857
C. M. Ordonez	72	27.10	8,834
Emmett Heidrick	42	30.17	8,834
Kikuichi Matsumoto	76	28.23	8,830
Meek & LeMaitre	127	28.29	8,826
Morita Bros.	70	28.09	8,810
George Walter Anderson	28	26.57	8,806
Howard Bros.	23	30.11	8,792
Arnold Collier	144	28.55	8,764
J. R. Phillips	38	27.10	8,738
John B. Anderson	48	28.91	8,726
Schroeder Bros.	76	28.20	8,691
Oji Bros. Farm, Inc.	183	28.80	8,674
Arnold Collier	137	26.46	8,674
Floyd E. Warner	40	29.51	8,670
Porterfield & Stephens	180	29.72	8,666
Joe Gnoss, Jr.	137	27.88	8,666
Giannoni Bros.	34	26.91	8,660
T. & F. Farms, Inc.	90	27.37	8,648
Robert Leslie Button	89	28.99	8,628
Meek & LeMaitre	69	27.04	8,610
Dick & Gary Dettling	35	31.24	8,610
Chew Bros.	80	27.66	8,596
J. Dudley Stephens	25	29.30	8,596
D. E. & D. J. Wilson	18	27.91	8,586
Emmett Heidrick	79	26.73	8,574
John Emerson Jackson	10	27.30	8,566
Wilson Lovvorn	75	27.70	8,560
Oscar Durst Sr. & Jr.	110	25.36	8,552
George B. Weiss, Jr.	26	27.02	8,528
Wm. E. Duncan	87	26.62	8,524
Keith B. Nelson	128	27.70	8,508
John E. Jackson	20	26.40	8,500
L. Knight Co.	36	28.87	8,476
Howard Bros.	51	31.09	8,462
Henry Rehrmann	108	27.00	8,446
A. H. Rominger & Sons	28	28.94	8,444
Wetzel Bros.	202	27.74	8,432
Meek & LeMaitre	106	25.44	8,430
Ernest J. Weyand	31	25.50	8,380
Fred H. Rehrman	117	27.54	8,366
Arnold Collier	31	25.51	8,332
Bulkley Ranch	94	26.08	8,330
Emmett Heidrick	12	27.24	8,330
Vernon E. Eriksen	78	25.52	8,320
Meek & LeMaitre	167	25.75	8,318
Leroy Traynham & Son	40	29.99	8,302
C. M. Ordonez	96	26.12	8,296
E. L. Wallace & Sons	119	29.94	8,294
J. R. Phillips	28	26.37	8,294
Robert J. Rooney	6	30.59	8,247
Roth Bros.	74	25.50	8,226
James I. Tadlock	55	31.26	8,221
Pete Konitzer	161	26.57	8,210
Shigaki Bros.	160	25.30	8,202
Robert C. Schulze, Jr.	54	25.87	8,180
Ted Mata, Jr.	36	25.04	8,178
Heidrick Bros.	64	25.66	8,160
Orth Bros.	53	25.47	8,156
Solano Frams Corp.	144	25.06	8,124
Vernon A. Mast & Sons	58	25.04	8,118
Howard Bros.	88	27.65	8,102
Roger D. Moore	78	25.55	8,099
Robert Leslie Button	84	27.70	8,072
James D. Goodman	44	26.76	8,071
Wallace Bros.	40	31.22	8,049
Catherine Strehle & Sons	88	26.17	8,040
Keith B. Nelson	87	27.88	8,040
Heidrick Bros.	143	27.20	8,035
Dela Torres Bros.	103	28.21	8,034
Van Smith	61	32.87	7,981
John D. Stephens	38	27.22	7,976
James I. Tadlock	69	25.83	7,966
John J. Vanetti	128	25.48	7,950
Meek & LeMaitre	76	28.84	7,931
Robert C. Schulze	94	28.06	7,930
Keith B. Nelson	17	27.39	7,927
W. R. Peterson & Son	74	28.07	7,888
Heidrick Bros.	172	26.33	7,868
E. J. Evans & Son	97	25.82	7,865
Wallace Bros.	150	25.80	7,848
Orth Bros.	126	28.27	7,831
Robert J. Rooney	17	26.56	7,830
H. E. & Donald Helms	17	27.58	7,810
T. & F. Farms, Inc.	50	25.73	7,806
Wetzel Bros.	59	27.28	7,802
Bernie Gorman, Jr.	73	25.22	7,778
Leroy Traynham & Son	30	27.84	7,778
Leroy Traynham & Son	20	26.62	7,778
James D. Ward	83	25.44	7,769
Harlan & Dumars	262	30.02	7,769
Robert J. Rooney	37	26.11	7,744
Michael T. Phelan	150	25.69	7,742
Nishikawa Bros.	296	28.39	7,733
R. E. & R. H. Lauppe	23	25.01	7,718
R. M. Farnsworth	100	26.57	7,716
Rominger Bros.	106	26.33	7,710
Lloyd M. Eveland	245	25.42	7,708
Manuel Bastiao	73	27.76	7,695
Robert J. Rooney	81	27.20	7,682
R. R. Peters	26	25.76	7,640
Tsutsui Bros.	84	25.02	7,631
Wetzel Bros.	10	29.88	7,625
Theodore Strehle	37	27.25	7,603
Schoeningh Farms	113	25.15	7,580
Rosalind G. Criste	51	26.41	7,553
Paul Reiff & Sons	37	32.86	7,552
Morris Carden	37	25.22	7,516
Dela Torres Bros.	64	28.64	7,515
Timm & Pistor	98	25.32	7,515
Buchignani & Hughes	105	26.28	7,280
George M. Struve, Jr.	85	25.10	7,264
Noboru Hitomi	172	25.15	7,228
Kenneth Breckenridge	13	25.35	7,174
Robert Leslie Button	109	25.46	7,160
Heidrick Bros.	248	28.08	7,144
Donald Mumma	65	25.71	6,983
Meek & LeMaitre	90	25.75	6,804
Orrick Farms, Inc.	97	25.03	6,798
Frazier & Sandoval	191	25.62	6,712
M. B. Avilla	74	25.73	6,710
Emmett Heidrick	95	30.05	6,653
Joe & Rudy Miramontes	100	26.09	6,398
Wetzel Bros.	188	26.10	6,306
Meek & LeMaitre	138	25.57	6,275
Lloyd M. Eveland	74	25.12	6,195
Oji Bros. Farm, Inc.	222	26.07	6,158

DISTRICT 4 — MENDOTA

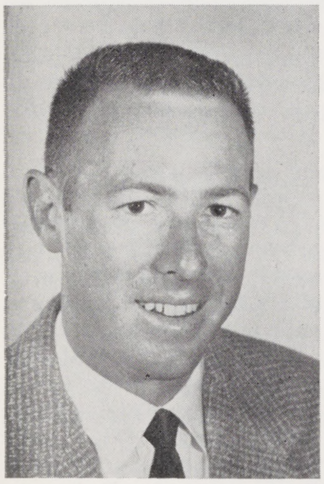
Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Markarian Farms	37	44.57	12,970
Walter Jalonen	10	40.67	11,184
A. & D. Koligian	15	45.19	11,062
Albert J. Perry & Kenneth A. Perry	28	37.56	10,832
Albert J. Perry	55	36.42	10,635
Eldon J. Findley	22	44.58	10,619
W. M. & D. L. Colson	81	41.72	10,513
Herman Carey	43	35.56	10,206
McCarthy-Hildebrand	223	39.18	10,187
Double L. Farms	38	38.13	10,143
Hugh S. Jewett	24	37.89	9,980
J. C. Freeman	54	37.54	9,723
Norman H. Fries	71	38.16	9,677
Fawcett Farms	73	34.63	9,634
Hanson & Fortune	51	33.20	9,621
Harold D. Weis	19	34.44	9,492
Edward R. Lewis	196	30.88	9,486
Norman H. Fries	37	36.80	9,465
Joe G. Fanucchi & Sons	6	32.78	9,382
McCarthy-Hildebrand	76	37.23	9,285
Manuel Garcia	16	36.45	9,222
Wm. Erickson	115	36.32	9,218
Joe Fialho & Son	83	30.54	9,107
Hugh S. Jewett	38	34.38	9,104
A. L. Fourchy	104	28.22	9,070
C. E. & R. B. Klepper	56	33.22	8,989
Eugene Nord	37	32.03	8,981
Hanson & Fortune	57	33.77	8,908
Schramm Ranches, Inc.	77	30.11	8,816
Edward Wagenleitner	79	34.80	8,797
Christiana & Skaggs	150	32.12	8,782
Fredlo Farms	79	29.60	8,750
McCarthy-Hildebrand	218	35.78	8,745
Joe Mendes	60	32.05	8,743
C. A. Makin Ranch	65	27.83	8,727
Tavares & Teore	34	34.01	8,693
Foglio Bros.	19	31.58	8,684
Hedman & Sons Ranches	72	29.14	8,678
Robert L. Hayes	17	30.72	8,602
Redfern Ranches	334	27.90	8,588
Hugh Bennett	64	32.58	8,581
Vincent Kovacevich	34	39.60	8,554
Noel Bros.	50	30.93	8,543
A. & D. Koligian	45	33.05	8,520
Bob Cauzza	120	30.67	8,477
Newhall Land & Farming Co.	79	30.06	8,465
Kern County Land Co.	38	32.37	8,403
C. E. & R. B. Klepper	42	34.87	8,390
J. Howard Porter	56	31.96	8,354
Floyd Hudiburg	110	31.35	8,339
Calflax Co. - Burrel Ranch	61	31.89	8,336

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Floyd Hudiburg	70	35.24	8,331
M. F. Lima	15	30.96	8,310
Frank Heuer	15	30.72	8,294
Manuel Garcia	15	36.32	8,252
P. A. Walls	90	29.93	8,243
A. Lo Bue Farms	48	30.80	8,224
Kern County Land Co.	59	29.06	8,212
Frank Heuer	15	29.00	8,195
Dillon Bros.	10	30.59	8,192
Carl C. Gunland	76	30.09	8,184
Pomeroy & Jewett	38	28.48	8,151
Newhall Land & Farming Co.	79	29.00	8,137
Double L. Farms	76	29.14	8,136
W. E. Hildebrand	110	28.64	8,128
Turner Island Farms	461	28.49	8,125
Albert Bagdazian	35	27.79	8,098
J. Howard Porter	100	33.76	8,069
Willson Farms, Inc.	130	29.23	8,067
Pilibos Bros., Inc.	103	31.25	8,031
Pomeroy & Jewett	24	32.33	7,992
C. R. Wilkins	138	26.75	7,961
Vie-Del Grape Products Co.	77	27.00	7,960
Motte Ranches, Inc.	69	26.20	7,944
A. Lo Bue Farms	15	33.12	7,942
Paul Crevolin	108	26.42	7,942
A. H. Wegis & Sons	75	27.74	7,917
Newhall Land & Farming Co.	138	26.26	7,915
Bob Cauzza	94	26.06	7,854
Kenneth E. Royer	63	28.01	7,848
Frank Garone Farms	39	28.54	7,843
Tony V. Cardoza & Son	83	27.73	7,809
Double L. Farms	181	29.60	7,808
Giacomazzi Bros.	20	31.59	7,796
Harold J. O'Banion	144	27.92	7,795
Richard, Lee, Robert, Gregory and Kathy Markarian	7	28.78	7,765
Kenmar Farms	78	31.49	7,753
Comfort Farms, Inc.	137	26.14	7,748
Lee Herring	79	28.94	7,733
L. F. Atkins	15	26.09	7,733
Dutra Bros.	20	30.38	7,710
B. T. V. Farms	20	25.07	7,706
Markarian Farms	76	28.19	7,695
C. L. Erickson	115	31.76	7,692
Newhall Land & Farming Co.	104	28.11	7,674
Arvid Allen	34	28.88	7,665
D. Lapenta & Co.	85	27.39	7,653
Amerigo Sandrini	45	33.84	7,614
Vincent Kovacevich	94	32.95	7,611
Banducci Farming Company, Inc.	117	30.53	7,596
Kenneth Peelman	40	29.74	7,596
Duane Soares	36	33.03	7,584
Irwin Efird	84	27.49	7,549
Frank Heuer	12	26.56	7,532
John R. Wagenleitner	18	28.74	7,507
Dan Dostinich	36	28.77	7,469
Pryor Farms	197	28.30	7,449
J. Sanchez & Sons	120	25.28	7,447
Newhall Land & Farming Co.	40	26.46	7,446
Robert M. Taggart	60	27.80	7,428
Earl Royer	60	27.93	7,401
Sam & D. M. Biancucci, Inc.	78	27.75	7,376
Wasson & Emerson	146	29.20	7,358
Giusti Farms, Inc.	152	26.68	7,332
Eckhardt Tripple	15	29.92	7,324
G. E. Paxton	49	27.24	7,317
N. L. Ritchey	74	27.31	7,297
O. O. Portwood	75	25.36	7,288
R. Vallicella	68	26.75	7,281
F. A. Yearout Co.	102	28.37	7,274
Keith E. Mitchell	80	28.89	7,257
S. C. Pinheiro	38	29.71	7,249
John H. Bagdanoff	17	28.25	7,249
Frank Avinelis	55	28.23	7,244
Bruno Lometti	46	27.94	7,231
John Nobile	28	28.78	7,229
Melvin McConnell	83	29.34	7,224
Giusti Farms, Inc.	192	26.27	7,214
Dan Dostinich	10	29.25	7,213
McCarthy-Hildebrand	98	28.58	7,208
James B. Gardiner	60	27.00	7,204
Joe G. Fanucchi & Sons	31	27.38	7,195
Elo & Vido Fabbri	92	25.09	7,181
Janet P. Johnson	36	30.03	7,177
Eckhardt Tripple	19	28.04	7,123
Herman Carey	12	25.13	7,167
Sherman A. Cave	60	28.14	7,164
Houchin Bros. Farming Co.	55	25.75	7,164
J. Sanchez & Sons	115	25.50	7,155
Gerald Pirtle	43	25.41	7,155
Leon H. Olliviera	17	30.09	7,149
Paul W. Demkey	53	30.77	7,145
Hugh S. Jewett	24	25.31	7,137
Hanson & Fortune	34	27.18	7,094
M. F. Lima	33	25.76	7,094
Sullivan & Gragnani, Inc.	78	25.82	7,090
Tavares & Teore	55	27.45	7,082
James W. Kalpakoff	48	26.26	7,080
Jack Alderson	52	26.06	7,067
John H. Guthrie	75	27.15	7,053
Newhall Land & Farming Co.	46	27.62	7,043
John P. Larson	19	25.52	7,038
Houchin Bros. Farming Co.	135	26.18	7,037
Joe Garone	32	33.90	7,024
Arthur J. Cuelho	216	25.02	7,016
Edward Wagenleitner	36	29.53	7,010
Edward Kezirian	72	27.06	7,008
Schultz Ranch, Inc.	89	25.74	7,006
Fred Elder	55	27.73	7,005
Kern County Land Company	132	28.92	6,999
J. G. Boswell Co.	296	27.53	6,998
Richard D. Hohlbauch	32	26.86	6,989
Pomeroy & Jewett	37	25.18	6,985
Gary E. Waller	59	27.16	6,969
Schramm Ranches, Inc.	68	25.55	6,965
John D. Mederos	73	25.30	6,952
O. O. Portwood	38	27.91	6,922
Newhall Land & Farming Company	38	25.51	6,898
Dusan Misita	35	26.78	6,882
S. A. Camp Farms Company	129	25.68	6,877
A. J. Quist Dairy	19	26.37	6,861
Leo Wagenleitner	64	25.84	6,858
McKittrick Ranch, Inc	107	27.55	6,827
Fredlo Farms	126	30.01	6,788
Cody A. Noel	20	25.77	6,772
Joe P. Alvarez	108	25.41	6,759
McKittrick Ranch Inc.	355	27.56	6,725
Julia De Campos	75	26.65	6,716
Dan Dostinich	59	26.18	6,713
L. F. Atkins	12	25.86	6,713
C. Paul Johnson	84	27.63	6,659
Dutra Bros.	38	26.00	6,651
John F. Simas	86	25.87	6,643
Cerro Bros.	75	27.82	6,638
Gammon Bros.	10	27.04	6,571
W. R. Kurtz	51	25.67	6,546
Kenmar Farms	46	31.92	6,537
R. A. Hildebrand	100	25.47	6,505
S. A. Camp Farms Company	147	26.16	6,414
Joe Craveiro	38	25.62	6,349
R. Vallicella	113	25.88	6,335
Victor J. Krause	74	25.73	6,283
David Noel	22	25.15	6,207
Sunset Ranch	300	25.57	6,142
Herluf B. Fries	77	26.55	6,091
G. E. Nichols	36	25.96	5,992

Notes from Our Field Men

Written specially for this issue, these notes were prepared to reveal some of the methods, machines and systems employed by Honor Roll Growers in several areas.

MICHAEL T. DAUGHERTY—WOODLAND



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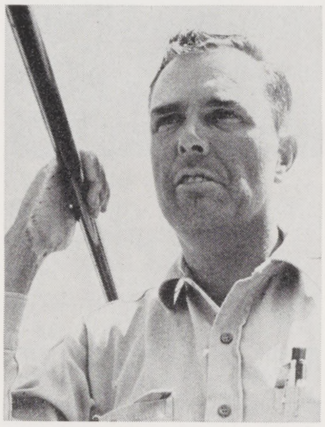
One of the more successful beet growers in District 3 is R. L. "Bob" Button, who has farmed in the Winters area since 1947. He was one of the first row crop farmers in this area, and has had several years of outstanding beet crops. His name has appeared on Spreckels' "Honor Roll" with regularity.

There are several reasons for Bob's continuing success, not only with sugar beets but other crops such as tomatoes, alfalfa, milo and orchard crops. One of the most important reasons is his early conversion to mechanzation in the field. While his cultural operations are timely and accurate, field mechanization has been the principal factor in Bob's successful farming operation.

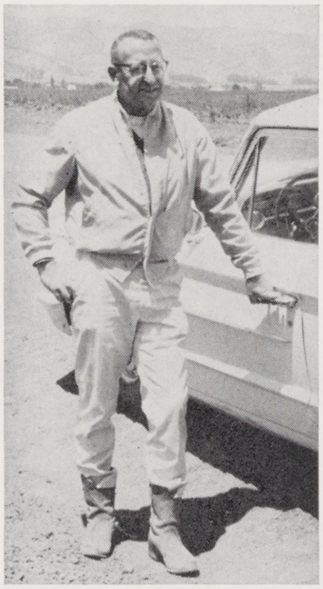


Paul Mapes Photo 58

Bob Button is "Mechanization-minded"; here he was seen riding and observing his tomato harvester.

Bob was one of the first growers in the area to utilize mechanical thinners on the beet crop. When multipurpose sleds first came into general use, he had already been utilizing one for some time, and had made modifications to do the job better. With the increased emphasis on chemical weed control, Bob was quick to convert his sled to include tiller mechanisms for incorporating weedicides. With the combination of chemicals for weed control and the utilization of mechanical thinners, Bob has consistently achieved beet crops with high tonnage and high sugar. More important he has put more money in his pocket by lowering his costs.

JAMES E. GARDINER — KING CITY



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In my twenty years in California I have become acquainted with about every type of hoe used in agriculture, from the small hacksaw band onion and celery scratcher to the old time brute, affectionately called by the Italians a "Garabaldi". The hoe (and star of this article) is the modern-day version found in any hardware store or tool shed in the Nation.

The attempt of every grower this spring was to reduce thinning costs without placing his crop in jeopardy due to poor and irregular stands. One of my growers, Bill Crinklaw, successfully attacked the problem in this fashion:

Bill purchased a four-bed Bye-Hoe shaper and incorporator sled on which he also mounted his John Deere Flexi-Planters. The planter units were set to distribute monogerm seed in the two to three inch range.

After considerable adjusting and modification to the incorporator and planter unit, Bill finally had this unit working so that he could apply Tillam properly, and the planters accomplished the job they were set up for.

As the beets emerged and reached a proper size, the field was evaluated on uniformity of stand, and proper knife selection was made for the Silver thinner units which Bill has been using for several years. In some cases he could use the tandem unit; in other cases he could only use a single head with the small knives. In all cases he only went over the field once with the Silver thinner.

Several days after the thinning machine had been used the field was looked over again by Bill and his hoeing crew foreman to decide whether to use long handled four inch hoes, or the more common short handled hoes.

Bill's foreman is a man with many years of experience in thinning. He has trained a crew of around twenty men to use long handled hoes in thinning. These men are not the usual run of labor who pass through the Valley every year, but young men who stay on the ranch most of the year.

Fidel, the foreman, taught them to space the beets much the same as in conventional thinning, but not to camp around each plant. Consequently these men were averaging from one acre to one and a half acres a day, leaving thinned stands of around 175 beets in 100 feet of row.

Continued on next page

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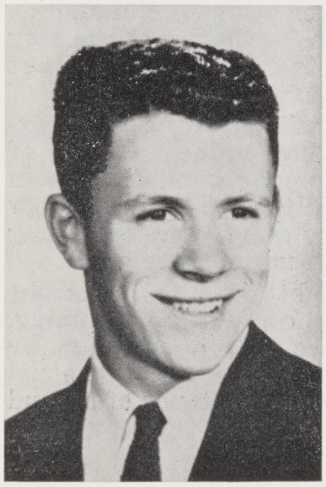
ABOVE—Bill Crinklaw's hoeing crew has been trained to use long-handled hoes in thinning.
BELOW—Uniform size of these young beets shows how effective Bill Crinklaw's system is.

Fields that had poor control of weeds were cleaned up by the same crew, using short handled hoes.

From my own personal observation I think these five factors are quite important in this method:

1. Proper tilth of the soil, so that the herbicide material is well mixed.
2. Constant moisture to insure germination of weed seeds and the beets.
3. A uniform stand, holding seeding rate to six seeds per foot.
4. A well trained foreman to supervise the hoeing crew.
5. A great desire on the part of the grower to make the system work.

WALTER H. TITCOMB — MENDOTA



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Over the past years, Bill Kurtz of Lemoore has consistently produced 25 ton (or more) crops on the early harvest program. In talking with Bill this past week, he indicated the things that he felt contributed to his success.

He felt the single most important factor was water (frequent irrigations with short runs). Bill draws an interesting correlation in saying, "Try to think of beets as a vegetable crop, being raised to hit the early market. In doing so, they have to be continually *pushed* from the day they are planted. The least amount of time lost during the growing period yields the best crop."

Bill Kurtz says, "At your earliest opportunity, throw away your disc hillers and pick up a set of Planet Jr. Spyderwheels to at least triple your first cultivation speed on any row crop." ..

W. H. Titcomb Photo

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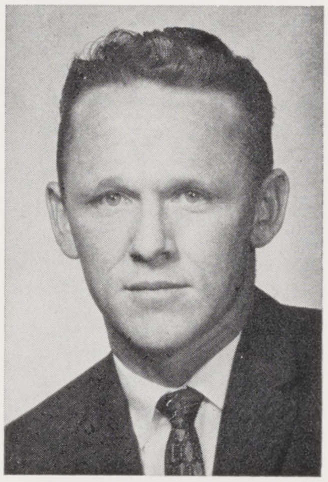
ROBERT ALDERSON — BAKERSFIELD



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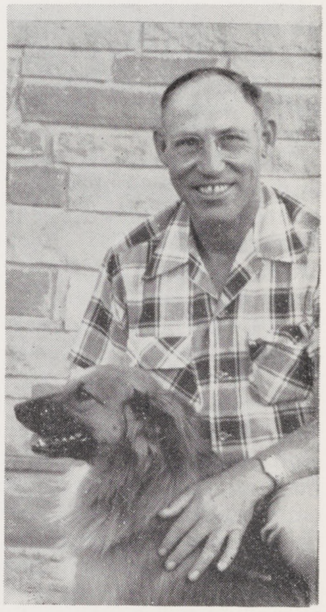
Growing a successful crop of beets for the early July harvest is a challenge to all growers in Kern County.

One of the outstanding growers in the county is Lester Frick of the Arvin area. (His contracts appear on the current Honor Roll as "Double L Farms"). Lester, a 25 year veteran in the beet business, has consistently produced crops which average 30 tons per acre. His prime objective is to grow a crop which will yield 25 tons or better on the opening day of harvest. This is done by a carefully planned program of fertilizing and irrigating which can best be explained by Lester.

"Pre-plant land preparation is probably one of the most important steps in beet culture, and probably one which is most abused. I consider pre-irrigation a must. This not only gets water into the soil when it is not needed for other crops, but also germinates many of the weed seeds which would normally come up with the beets. After pre-irriga-



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LESTER FRICK

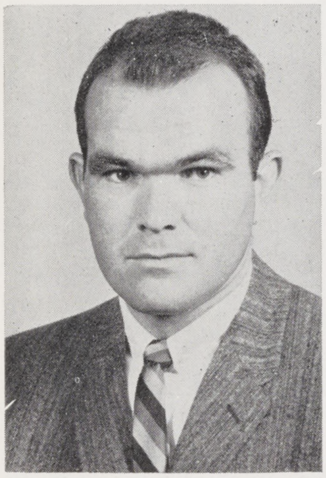
tion the soil is treated for Root Knot Nematode, and at the same time pre-plant fertilizer is applied. I believe pre-plant fertilizer not only gets my beets off to a faster start, but also gives me more time at thinning time.

"Planting is usually started around the middle of December. In order to do this I have arranged my rotation schedule so only about half of the beets are following cotton. This allows me to get my early harvest beets planted in December while I am working the ground which is to be planted to beets following cotton.

"Last year I switched over to sprinkler irrigation and can safely say I picked up 2 or 3 tons per acre. I believe this was due to more uniform irrigation and less fertilizer leaching. My goal in irrigation is 'never to see a wilting beet.' In our short growing season, every day must be a 'growth day', since we must take advantage of each day in order to have a paying crop at harvest time."

As can be seen by Lester Frick's outline, his operation is not much different than many others around the County, however, I believe the key to his success lies in the one critical factor—"TIMING". Probably the one operation which is most abused by many farmers is irrigation and, once again, it is not so much the method of irrigation, but the timing of applications. If everyone will strive to make everyday a "growth day" perhaps we will have sweeter returns at harvest time.

D. R. BANTA, JR., — MENDOTA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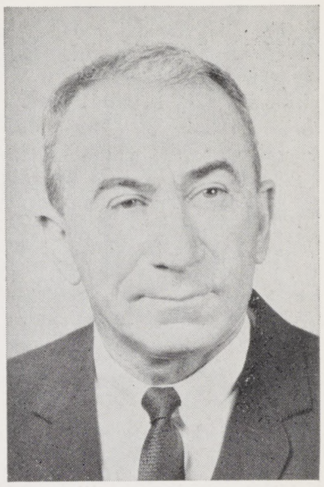
Mr. Dick Markarian is a farmer growing sugar beets for Spreckels Sugar Company in Fresno County. Relatively speaking, he is a new grower, as he began growing sugar beets in 1962. Besides beets, Mr. Markarian is farming cotton, alfalfa seed, barley, grapes and walnuts. He has made a success of these various enterprises.

By using good management policies, and by having essentially good land to farm, Mr. Markarian has been coming up with outstanding yields consistently in practically all the crops he is growing. In 1963, a field of his sugar beets measuring 37 acres, topped the whole of District 4, as well as the whole of all districts in Spreckels Sugar Company, in tons per acre yielded. This whopping crop produced 50.99 tons of clean beets per acre. The 1964 crop season again finds him in top position on the District 4 Honor Roll.

Besides producing record crops in 1963 and 1964, Mr. Markarian also had some outstanding success with his cotton enterprise in 1963. The Ford Foundation has recently named him the top cotton farmer in the United States for that year, and he was awarded the sixth annual Ford Farm Efficiency award and he received a grant from the Foundation as well. The award is given for high economic production of high yield cotton. The grant he received has since been donated to help further research in the areas of cotton marketing and utilization.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Mr. Markarian has been and still is very active in a number of agricultural organizations. Among these are the Fresno County Farm Bureau, Mid-Valley Fire District, California Raisin Advisory Board, the Federal Raisin Advisory Board, and the Ranchers Cotton Oil Company.

JOE HULL — MANTECA

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For the fourth consecutive year Manuel Costa of Tracy has thinned and hoed his beets without the help of any Mexican National hand labor.

He uses Tillam for grass control, followed by mechanical blocking and harrowing with tine weeders.

His crops for the past three years have been as follows:

1962 — 33.8 tons — 15.3% sugar
1963 — 25.6 tons — 15.7% sugar
1964 — 33.0 tons — 16.4% sugar

Manuel thinks he has saved thousands of dollars over the past few seasons by his mechanization program.

MANUEL COSTA of Tracy says: "If I can do it with a tractor, it is cheapest and best for me."

Joe Hull Photo 68

EUROPEAN SUGAR BEET SCIENTISTS VISIT SPRECKELS ON NATIONAL TOUR

ON JUNE 9 AND 10, sugar beet scientists from 14 European and Middle Eastern nations toured the research facilities of the Spreckels Sugar Company at Spreckels, as well as nearby beet growing areas and the United States Department of Agriculture Research Station in Salinas.

56 visiting experts, members of the Institut International de Recherches Betteravieres (International Institute of Sugarbeet Research), arrived by charter plane at Monterey airport on June 9—a stop on the nationwide tour the group made as guests of the members of the American Society of Sugar Beet Technologists.

The study-trip was the second joint meeting of the two groups, whose membership includes most of the world's leading sugar beet scientists and technologists. Four years ago, members of the American society took part in a London meeting of the International Institute.

Points of interest visited during the tour included the Spreckels seed breeding and processing facilities, the United States Department of Agriculture Research Station at Salinas, and several of the mechanized sugar beet fields in the Salinas Valley

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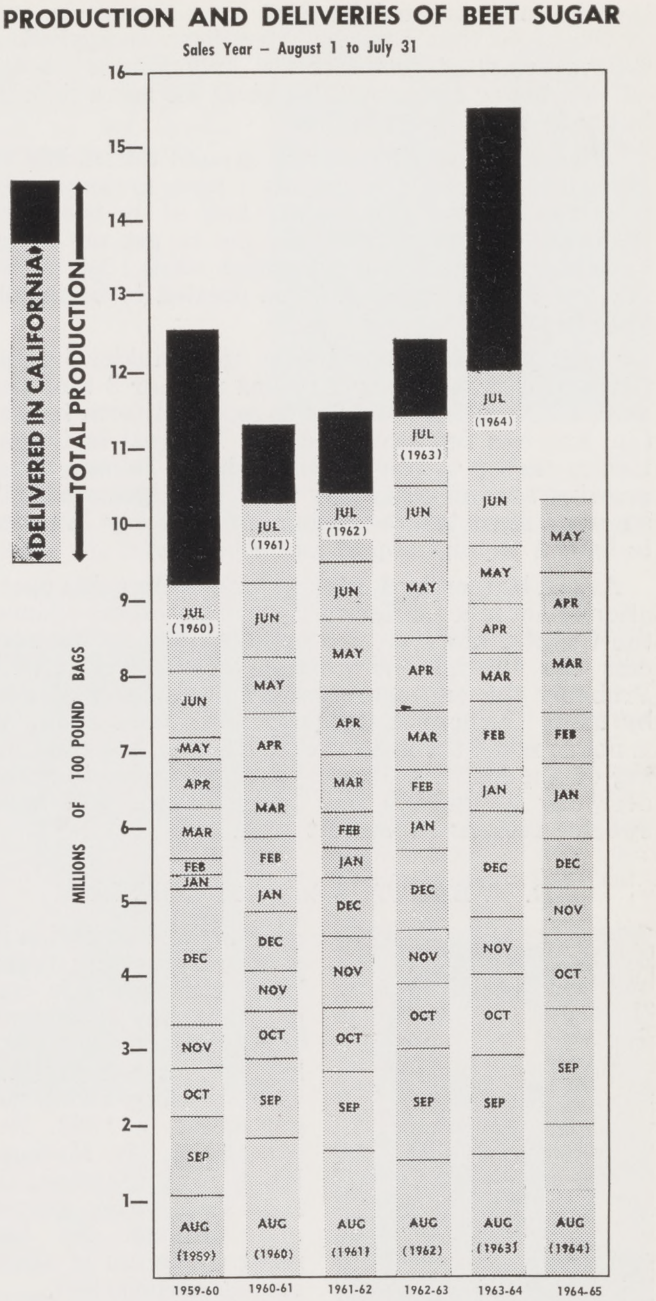
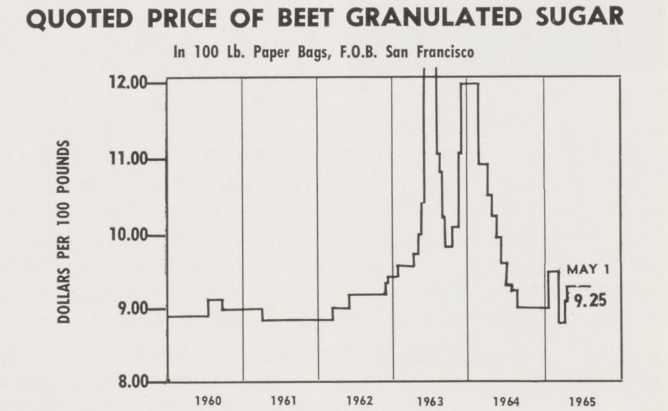
LEFT—IIRB President, G. von Engelbrechten and ASSBT Secretary, James H. Fischer deplane at Monterey.
RIGHT—the first busload of IIRB tour participants arrives at the Spreckels factory.





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AUSTIN ARMER, EDITOR
SPRECKELS SUGAR COMPANY WOODLAND, CALIFORNIA

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SPRECKELS SUGAR BEET BULLETIN

VOL. 29 SEPTEMBER-OCTOBER, 1965 NO. 5

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LOOK - - NO HANDS

Field labor's increasing cost, declining quality and shrinking availability are inducing more and more sugar beet growers to adopt complete field mechanization. Producing high-yielding crops with no hand labor is now well beyond the experimental stage. It can be done! See page 38.

1965--THE YEAR OF THE ALL-MECHANICAL SUGAR BEET

FOR SEVERAL YEARS PAST sugar beet growers have had access to chemicals, machines and methods capable of reducing or even eliminating stoop labor in the beet field. The continuing use of manual thinning and hoeing was not so much an indictment of the machines as it was evidence that labor was available. Quality and availability left much to be desired, but there was enough of each to get the job done—somehow, and at some price.

But 1965 saw the end of Public Law 78. Quality and availability of field labor suddenly fell to such low levels that many California beet growers went all out for spring mechanization.

One Spreckels field superintendent reports that 60% of this 1965 acreage in the Manteca area was grown without stoop labor. In all Spreckels districts, there has been a massive swing to Spring mechanization. Of particular interest is the work done by certain Salinas Valley growers who have not only made the decision to eliminate Spring labor, but who have planted large acreages on which to compare costs and returns of crops grown by both the old and the new methods.

Herb Meyer of Gonzales and Dean Pryor of Soledad have conducted large scale experiments along these lines. Their work has been followed closely by the Monterey County Farm Advisor's Office, and their Dave Ririe has recorded masses of data which will reveal exact figures for production costs and returns on crops in the same fields, produced with and without hand labor. (The Ririe report will appear in a future issue of this Bulletin).

Meanwhile, some growers are satisfied that precision planting and chemical weed control can reduce Spring labor requirements to a single long-handled hoe touch-up. Bob Johnson of Chualar planted over 100 acres with a 2½ inch spacing between seeds, had them thinned by hand for $20.00 per acre, and got a completely satisfactory job.

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COVER COMMENT — Herb Meyer (L) and Harold Voth, his Spreckels field superintendent, register satisfaction and pride in the Meyer field which was grown with no hand labor whatever.

1965 SPRING MECHANIZATION REPORTS FROM ALL DISTRICTS

DISTRICT MANAGERS and Agricultural Superintendents from each of the four Spreckels Agricultural Districts present herewith their experiences in 1965 with mechanical and chemical methods of thinning and weed control.

The scarcity and poor quality of field labor in 1965 is no longer news. But the uniformly successful confrontation with this situation by growers in all Spreckels districts is attested by these reports.

WALTER H. BUCKINGHAM

District Manager—Spreckels

IN 1965, sugar beet growers in the Salinas Valley area experienced the highest hand labor costs in the history of the sugar beet industry. These costs were brought about by two factors: 1., The inefficiency of labor and 2., Increase in wages from $1.15 per hour to $1.40 per hour. The efficiency of labor contributed the largest segment of this increase.

It should be obvious to the growers that he cannot continue to absorb these high costs. He may ask, "What can I do?" The answer is to mechanize; there is no other choice.

A few growers have mechanized and their results show that it can be done. For example, one grower has 140 acres which does not have one cent of hand labor for thinning or hoeing. Other growers have helped to reduce hand labor and costs through mechanization.

Problems will arise in the mechanization of sugar beets, such as wet fields, weeds and other minor obstacles. Surely, none of these is insurmountable.

Capital investments will have to be made for new equipment, but I state with confidence that these investments will yield a good return.

Today there is precision equipment available which will do this job of mechanization. Remember the word "precision," for this is the key to the success of mechanization.

The following recommendations are offered for the mechanization of beet crops.

1. Prepare a good seed bed.
2. Prepare level beds.
3. Incorporate chemical herbicides properly. (Failure to do this will make the use of chemicals of no avail.)
4. Precision plant. *Do not plant* any closer than 2 inch spacings down the row. Do not plant any faster than the manufacturer's recommended speed for the planter.
5. Irrigate as many times as necessary to insure good emergence.
6. Use mechanical weeders at the precisely correct time.
7. Mechanically thin or block, depending on stand.
8. Use mechanical weeders as long as necessary.

It is recognized that many growers will have to refine their farming methods in order to do precision work. We are confident that they can do this job, and will be well rewarded by the results.

JOHN McDOUGALL

Agricultural Superintendent—Manteca

SPRINGTIME IN THE BEET FIELDS in 1965 was a time of conjecture and worry as to the availability of an adequate labor supply. As it turned out in District II, the labor numbers were sufficient to get the job done well enough to get by, but the quality was all out of proportion to the cost.

To get the job done as we used to have it done—beets thinned to singles and all the weeds hoed—would cost anywhere between fifty and a hundred dollars per acre, depending on the stand and weed population. In cases where herbicides were applied correctly; where monogerm seed was planted at a light enough rate to space out the seedlings and where mechanical stand reduction tools were properly utilized, very successful crops have resulted. We emphasize that this was done at *no* reduction in cost over what we paid for the same hand labor jobs in the past. It did, however, get us through a very serious situation, and made us and our growers very much aware that mechanization was necessary. It also proved again that planning ahead to do proper land preparation; to be very precise and scientific in planting, application of herbicides, fungicides, nematicides and fertilizers were all definitely necessary. It also proved again that it is forcing the farmer to acquire a number of expensive new tools or services, but this is the only insurance against the rising cost of field labor.

The labor supply that was available is not going to do the *good* job of the past. They will get the long handle hoe trimming job done in a satisfactory manner. There were considerable numbers of good long handle hoe crews in our area. These people migrated from the southwest, where hourly wages were much cheaper. How long good workers will remain in California Agriculture is hard to say, but it is encouraging to find that we can put chemicals, machines and people together to get a job done.

I must also say, where growers hesitated to mechanize and were satisfed with a cheaper quality job, the stands are now too thick and the weeds too abundant. The profits, if any, are going to be too small.

DON R. HEFNER

District Manager—Woodland

DESPITE THE SCARCITY of good labor, some growers in the Woodland district were able to thin and hoe their beets at a modest cost. Generally speaking, the expected labor shortage did not materialize and crews were available to everyone. However, the quality of some crews was so bad that exhorbitant hand labor costs—up to $50.00 for thinning—were common. It is our feeling that the practices used by those growers who did get by cheaply are available to everyone, and could be duplicated.

At least 80% of the fields here were treated with weedicides, Tillam being the one used generally. Results were, for the most part good, and with continued progress in technique we can look forward to even more effective control. We are all aware of the fact that herbicides can be completely successful, and yet at other times seem to be quite ineffective, even though the same material, rate and equipment are used. In each case a factual analysis of the problem reveals that some controllable factor was overlooked. There is no substitute for diligence and precision, and great care must be taken to make chemical weed control successful.

One of the more promising practices tried here is the use of Treflan as a "lay by" after thinning and hoeing. Bob Schulze, who farms in the Dixon area, has conducted a full field trial using Treflan as a post-thinning and hoeing weedicide. He applied the material as a spray and incorporated it into the beds using a Lilliston finger cultivator. Results so far show excellent control of secondardy weeds after thinning. Small weeds which germinated prior to the Treflan application are not growing. There appears to be very little if any new weed germination, and the field gives every indication it will retain weed control for the rest of the growing season.

Planting to a stand has not as yet resulted in an overall hand labor reduction, due mainly to increased weed hoeing costs. We had hoped that the several fields where planting to a stand gave good emergence would have little or no hand labor. But spaces between beets proved a good place for weeds. It is now our feeling that the best planting is 10 to 12 seeds per foot, then by the use of mechanical stand reducers and weedicides, the beet population will be adequate and the weeds will disposed of.

One practice we intend to enlarge upon for the coming year is that of pre-irrigation for weed control. This area is largely a late-plant area, and most plantings are made in late April and May. This is the optimum time for the germination of watergrass and broad leaf weeds A pre-irrigation of listed and shaped beds would not only start most of the weeds, but would virtually eliminate clods so that the application of the weedicide chemicals should be more effective. By carefully working the beds, little or no new weed seeds would be exposed. Since it is normal to irrigate twice for good germination, this practice would not mean an extra irrigation expense, and would result in a much lower total hand labor outlay.

The prime obstacle to achieving a mechanized thinning program is the grower's determination to use available hand labor, regardless of the cost. In theory, hand thinning no matter how costly, pays for itself by increasing yield. In fact, hand labor has deteriorated so much that a good mechanical job is equal, if not superior. Our fieldmen here are going to continue to urge that the grower think in terms of an all-out effort to eliminate the use of hand labor by every means available.

DAN L. DIETER

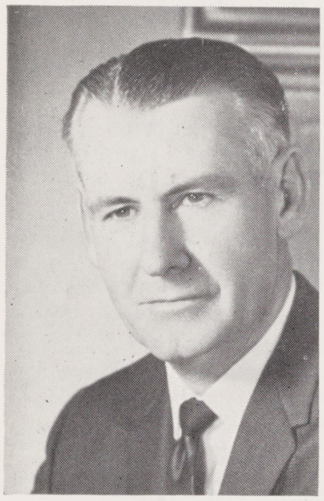
District Manager—Mendota

THE PLANTING PERIOD of the beet crop in District 4 extends over a 6 month period. This period is from November 1 to April 1 with most of the crop going in from December 1 to March 1.

Each year during the past three years, several thousand acres of beets have been treated with pre-

Continued on Page 42

ARIZONA AGRICULTURAL DISTRICT 5 ESTABLISHED--STAFF SHIFTS FOLLOW



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RALPH S. LAMBDIN
To Chandler

AS FACTORY 5 near completion at Chandler, Arizona, the Agricultural Department is preparing to meet the factory's need for sugar beets. Ralph Lambdin, former District Manager at Manteca, has moved to Chandler and will establish headquarters for the District 5 Agricultural Department. The District 5 personnel at this writing follows:

NAME	FORMER TITLE & LOCATION	DISTRICT 5 TITLE
Ralph S. Lambdin	District Manager, Manteca	District Manager
James E. Gardiner	Field Superintendent, King City	Agricultural Superintendent
Jack Brickey	Agronomist, Woodland	Agronomist
Charles Carlson	Field Superintendent, Grimes	Field Superintendent
Jay Hill	Field Superintendent, Woodland	Field Superintendent

These new job assignments have created shifts within the staff in other districts. The former and new positions of staff members so affected are here tabulated:

NAME	FORMER TITLE & LOCATION	NEW TITLE & LOCATION
Stewart S. Anderson	Agricultural Superintendent, Mendota	District Manager, Manteca
Dr. Varon Jensen	Plant Physiologist, Spreckels	Plant Physiologist, Woodland
J. Norman Dawe	Field Superintendent, Gilroy	Field Superintendent, King City
Arthur C. Young	Field Superintendent, Watsonville	Field Superintendent, Gilroy
Lee O. Seda	Assistant Field Superintendent, Woodland	Field Superintendent, Grimes

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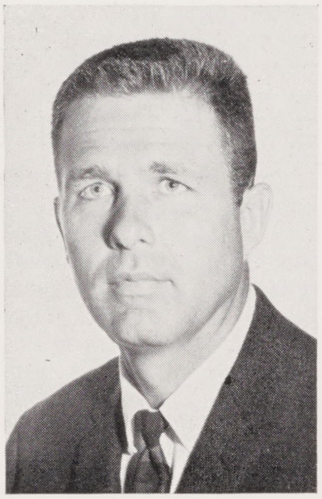
JAMES E. GARDINER
To Chandler



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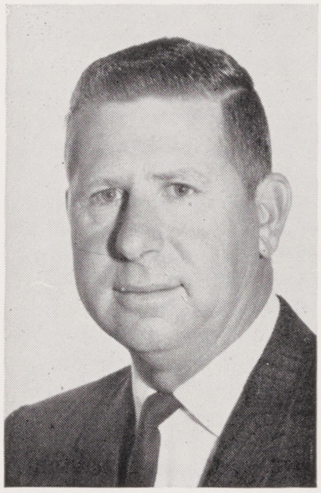
JACK BRICKEY
To Chandler



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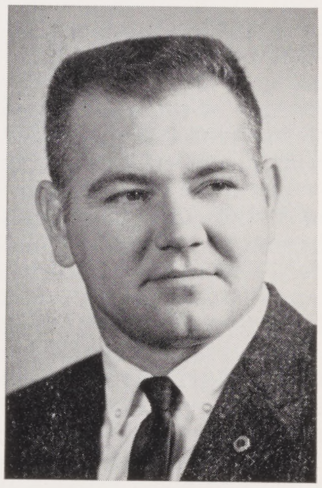
CHARLES CARLSON
To Chandler



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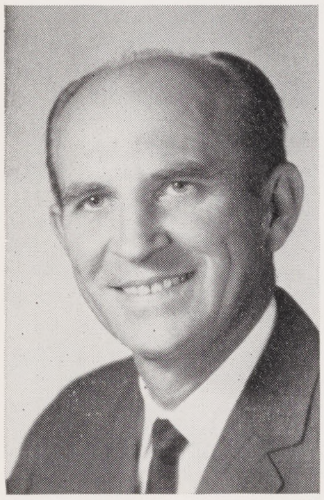
JAY HILL
To Chandler



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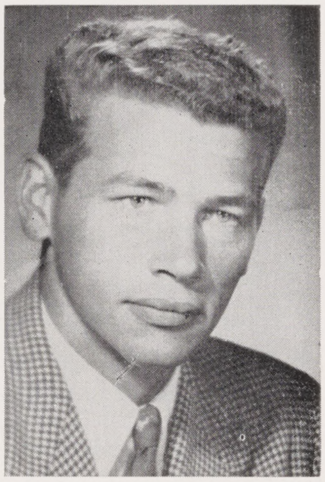
STEWART S. ANDERSON
To Manteca



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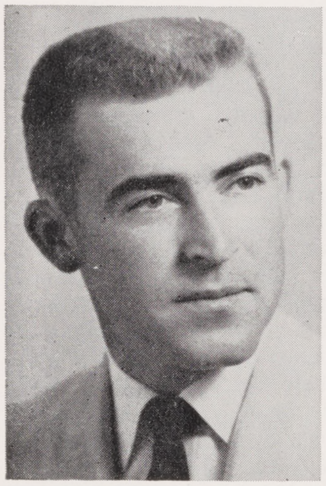
J. NORMAN DAWE
To King City



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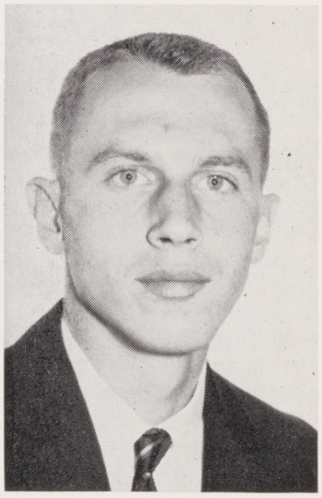
ARTHUR C. YOUNG
To Gilroy



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LEE O. SEDA
To Grimes

ARIZONA PLANT TAKING SHAPE

Spreckels Sugar Company's fifth factory, now under construction near Chandler, Arizona, is beginning to assume a number of the characteristics that will mark it as a major industrial complex.

Overall, the big facility is about 50% complete. And although some 18 months remain before commercial production is scheduled to begin, several of the buildings and appurtenances are already in evidence at the 650 acre site.

Principal eye catcher at this early date is the beet pulp warehouse. The huge corrugated steel building, rising 90 feet above the valley floor, contains enough floor space to accommodate an entire football field.

Another storage facility—a 1,850,000 gallon capacity molasses tank—is now nearly complete. Some 28 feet high and 106 feet in diameter, the big steel tank will hold the molasses obtained as a byproduct in the sugar extraction process.

The Shops and Stores Complex, a 22,000 sq. ft. building that will house the factory's electric, carpentry, plate and machine shops has reached the stage of completion where it can now serve as temporary offices for the on-site construction management personnel.

Two swimming pool-like structures for fire protection water have been completed and filled.

The water treatment area will recycle the factory's process water in order that it can be used over and over again as Arizona grown sugar beets are turned into pure sugar. Large quantities of water will be utilized in the operation of the Spreckels factory. However, extensive and costly water conservation measures are to be taken.

In the principal processing area, structural steel continues to rise on the main factory building. Progress on this four story structure hinges to some degree on the installation of certain of the manufacturing equipment, which, because of its immense size, is positioned and the steel framework of the building then put in place around it.

Other major construction milestones at the site include completion of work on the bulk sugar storage silos. Reinforced concrete foundations extending 17 feet below the surface were installed. The silos—50 feet in diameter—rise 116 feet above the surrounding countryside. The combined storage capacity of six principal silos, plus two additional storage shafts formed by the internal walls of the six, exceeds 67,500,000 pounds of refined sugar.

Considerable progress has been made on the sugar beet receiving facilities. Already completed is the 10,000 ton capacity beet storage slab. This semicircular, reinforced concrete structure will store incoming beets until they are required by the factory.

Two scales to weigh incoming beet trucks are in place. Each scale deck is 70 feet in length and positioned to handle the largest trucks with ease.

All in all, significant progress has been registered during the first nine months the Spreckels factory has been under construction. During the early phases, much of the labor and material was devoted to sub-surface construction.

Now, however, with much of the work taking place above ground, passersby on Arizona Highway 87-93 can see the factory rapidly taking shape. A great deal remains to be accomplished, of course, but Arizona's newest industry — Spreckels Sugar — is well on the road to reality.

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CONSTRUCTION OF FACTORY 5 proceeds apace, as vacuum pans, crystalizer and granulator are installed at the Chandler site.

RAY F. BANAHAN

The Bulletin is saddened to report the death of Mr. Ray F. Banahan, Jr., 39, who succumbed in St. Francis Memorial Hospital of cancer, August 25.

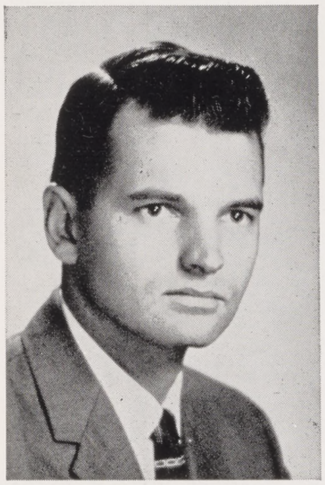
Mr. Banahan was supervisor of the beet growers section of the accounting department which deals with payment to the growers for sugar beets delivered to the factories and the handling of grower records.

A graduate of Sacramento State College and a World War II veteran, Mr. Banahan came to work for Spreckels in July, 1954, as senior book keeper in the Sacramento Office. He was transferred to the San Francisco office in 1955.

Survivors include his wife, Jo Marie; a daughter, Theresa Ann, 18; a son, Timothy James, 10; and his parents, Mr. and Mrs. Raymond F. Banahan of Sacramento.

Notes from Our Field Men

ROGER McEUEN — MANTECA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This year in my Collegeville area district mechanical thinning took hold very well, with 60.4 percent of the acreage thinned by machine.

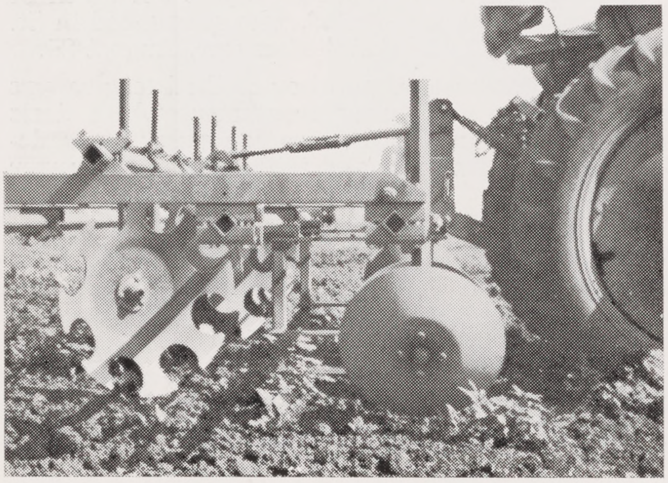
Two types of blockers were used: the Crop Master, and disc blades notched out to varying blocking and gapping distances.

Growers in my district have a knack for "do-it-yourselfing" and these disc blades were made to do a creditable job of blocking for as little as $65 for 4 rows.

Merlin Miller used disc blades mounted on his sled with his cultivating set-up for a once-over operation. Bill Sousa went over his beets first with the disc blades on a sled, then followed with a cultivating sled. Ben Lara and Jim Luis used two operations also. Sanchez Bros., near Rio Vista, thinned approximately 900 acres with disc blades with very good results. All growers were highly satisfied with them and found them excellent for blocking tomatoes, as well as beets.

The main problem is adjustability of the units; thus various sets of blades may be needed with different cutting and gapping distances. However, the price is so low that this is not considered a problem by the users.

EDITOR'S NOTE: The notched-disc blocker built by Bill Sousa was described in the California Beet Growers Association Bulletin for August. We are indebted to the Association for the photo below.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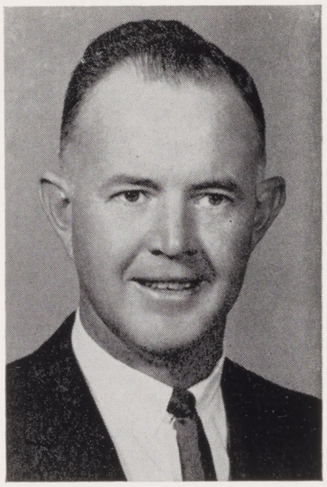
V. D. SHERWOOD — OCTOL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This is the time of the year when we give some thought to the evaluation of harvesting equipment being used this 1965 harvest season. The two types of harvester now being used are the spike-wheel (Marbeet) and the squeeze-wheel (Gemco, Farmhand, International John Deere, etc.)

The "Marbeet Midget" and "pull-behind" are doing very satisfactory work, and are dependable enough to get all of the production that can be expected from a one-row machine.

Several years ago the "lifter-loader" type machine was introduced and everyone became involved in this system of harvest. After working with this equipment these several years, we have developed problems that have not yet been fully solved. In my mind, there is no better system than the "lifter-loader" for removing *topped* beets from the ground. But one thing the developers of this equipment seem to have overlooked is "how do you get the tops off before you lift the beets?"

Over the last several years, many manufacturers have tried to make a topper to adapt to this system. Frankly, no one has come up with anything that is entirely satisfactory in this area. The so called "roto-beater" that we started with remains the only device that works under all conditions. This equipment tends to be expensive to buy and even more expensive to maintain. Also in this area, the interest in beet top salvage remains high, and roto-beating of tops elminates them from any further use. None of the scalpers or scalper-windrowers are quite satisfactory for the long run. Also in the area this year, weedy fields are commonplace, and the "lifter-loaders" are delivering great quantities of these weeds to the receiving stations. Cleaning rolls on some machines are doing a good job, but still they are not totally effective.

All in all, there needs to be some work done in development of beet harvesting equipment. Times are changing; fields will continue to be weedy and mechanical thinning will give us smaller beets. These and other changes will require some evolutionary, if not revolutionary changes in harvesting equipment.

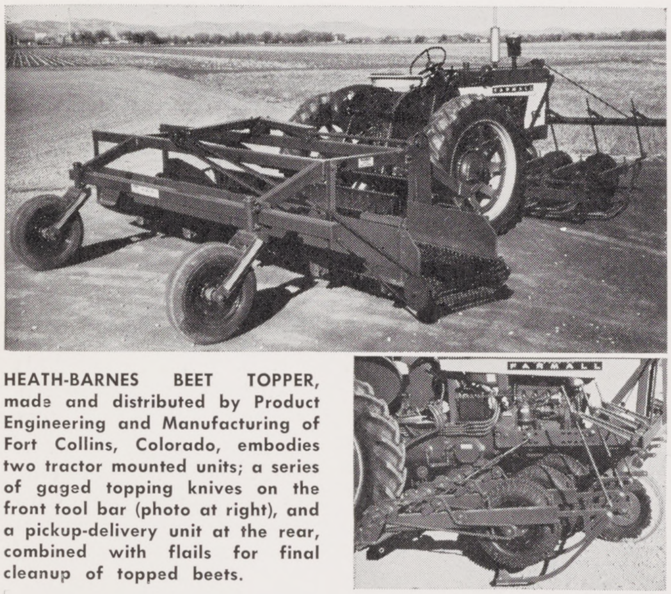
EDITOR'S NOTE: Amen. But perhaps some of the top-saving machinery illustrated on page 43 will help your situation. In any event most manufacturers have a very real desire to meet both field conditions and competition. We are confident that they will tax their ingenuity and even increase their research budgets in the future.

1965 BEET HARVESTER OFFERINGS EMPHASIZE BEET TOP SAVING

A REVIEW OF BEET HARVESTING machinery available for the 1965 Fall harvest indicates that manufacturers are emphasizing beet top recovery. We of the Spreckels Agricultural Department applaud this move—it is our conviction that beet tops are a valuable part of the sugar beet crop, and that growers are entitled to the income from all of their crop.

We recognize the obstacles which sometimes stand in the way of profitable beet top recovery. But enlightened growers in the Southern San Joaquin and Imperial Valleys are making solid progress in beet top utilization. Their operations are testimony to the fact that there is profit in beet tops, and that if they can reap these profits, so can other beet growers.

There appear on this page some of the 1965 Fall offerings by several manufacturers of beet harvesting machinery. The emphasis on beet top saving is self-evident.



HEATH-BARNES BEET TOPPER, made and distributed by Product Engineering and Manufacturing of Fort Collins, Colorado, embodies two tractor mounted units; a series of gaged topping knives on the front tool bar (photo at right), and a pickup-delivery unit at the rear, combined with flails for final cleanup of topped beets.

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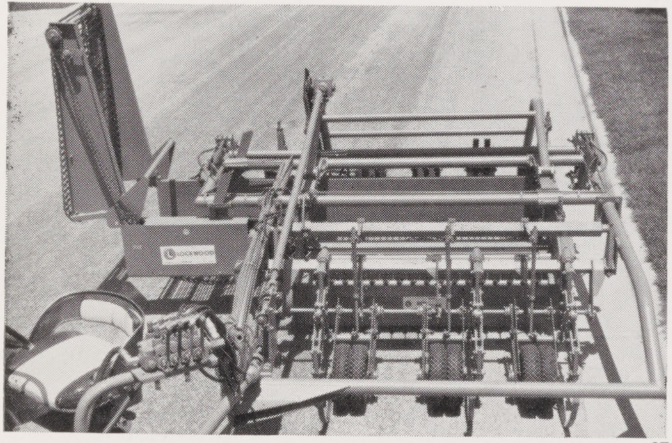

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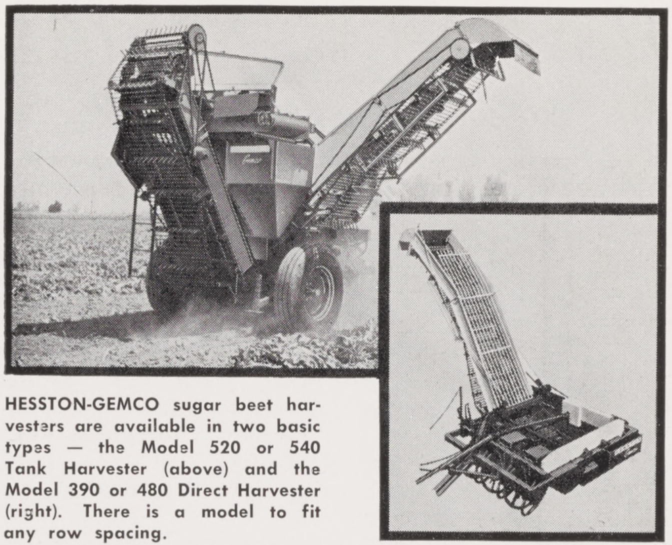
LOCKWOOD has added a new feature to its 1965 Beet Topmaster — pressure springs, activated by a hydraulic cylinder, permit depth of cut to be controlled for various conditions by changing the spring pressure. These adjustments can be made from the tractor seat.



HESSTON-GEMCO sugar beet harvesters are available in two basic types — the Model 520 or 540 Tank Harvester (above) and the Model 390 or 480 Direct Harvester (right). There is a model to fit any row spacing.

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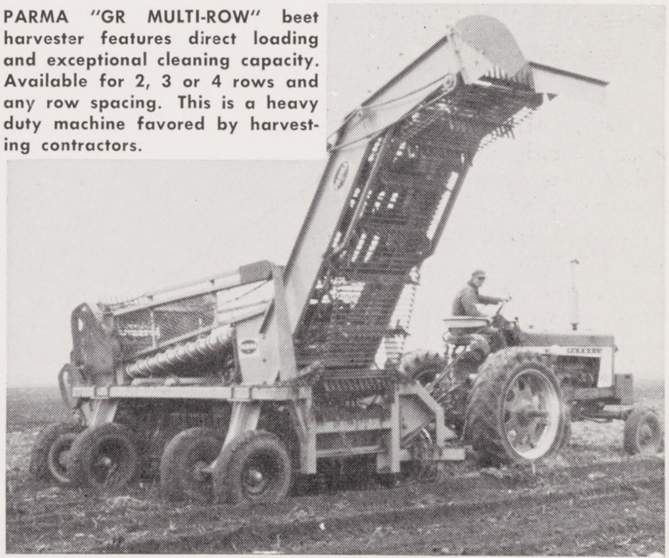

PARMA "GR MULTI-ROW" beet harvester features direct loading and exceptional cleaning capacity. Available for 2, 3 or 4 rows and any row spacing. This is a heavy duty machine favored by harvesting contractors.

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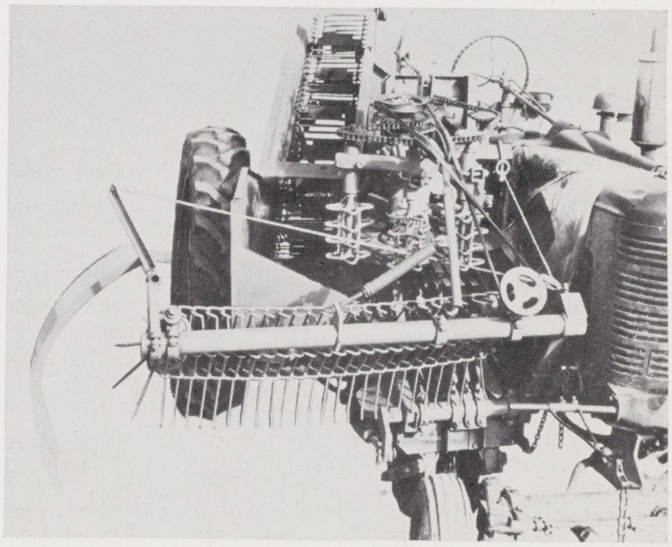

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BLACKWELDER MANUFACTURING COMPANY has developed this windrower-foliage conveyor for their Model "G" sugar beet harvesters. Tops from two rows are combined into a single windrow.

MECHANIZATION REPORTS

Continued from Page 38

plant herbicides. Results have ranged from minus to plus, with most of them being on the minus side. At the present time it can be said that the benefits of chemical weed control are very small in this area.

Until more effective heribicides are developed which will offer some degree of control under our planting dates, mechanical thinning and mechanical weed control methods are our only solution.

During 1965, only 1026 acres in District 4 were 100% mechanically thinned, while 6014 were thinned "once over" mechanically and then touched up by long handled hoes. Costs for the complete mechanical job ranged from $3 to $12 per acre, while costs for mechanical plus "touch up" ranged from $6.50 to $16.00 per acre.

The balance of the acreage in District 4 was thinned by hand at costs ranging from $14 to $25 per acre.

Certain areas in District 4 have had a sufficient supply of field labor in body, if not in spirit, to get the job of hand thinning done. However, some of the "bodies" have been barely warm.

Whether or not this situation will exist in the future remains to be seen. The disappearance of field labor has been a favorite subject of our news media for the past 7 or 8 months. There is no reason to assume that the vanishing labor is going to reappear in the future. The only solution is the replacement of the hoe by some mechanical device which in most cases does the job as well or even better than the presently available hand labor.

Mechanical thinning in itself cannot be accomplished for nothing. Trials carried on by the Spreckels Research Department at Mendota show machine costs, when all charged are computed, ranging from $10 ot $12 per acre. Additional long handled hoe ranged from $6 to $18 per acre in the plots. These costs were almost as expensive as some of our hand labor costs in the field, but the advantage was that the work was done on time. The stage of growth was proper for thinning, and the results were entirely acceptable.

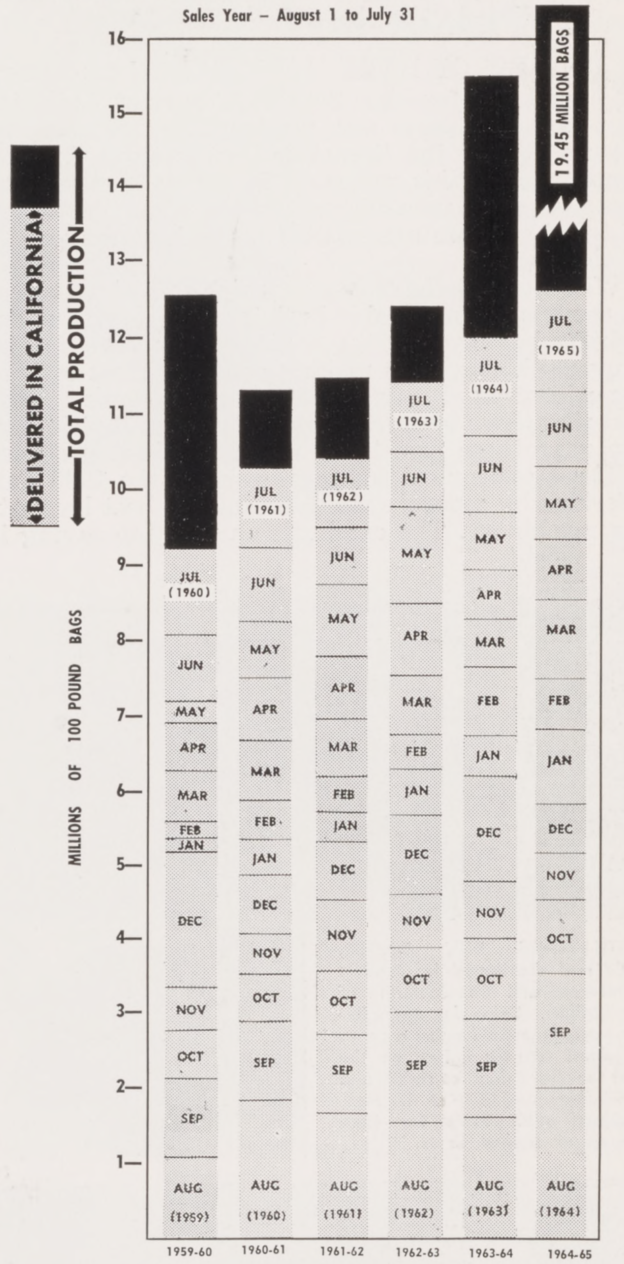
In the final analysis, it is a certainty that mechanical stand reduction with mechanical weed control is the only answer to the labor shortage. The use of mechanical thinning and precision planting present the only substitute for an undependable and inadequate labor supply.

The use of these methods has been proved in the field as well as in the research plot; they are the only answer to replacing the man with the hoe.

SPRECKELS SUGAR BEET BULLETIN is issued bi-monthly by the Agricultural Department of Spreckels Sugar Company as a service to its growers. Mention of specific methods, devices and implements does not constitute an endorsement by the Company.
AUSTIN ARMER, EDITOR
SPRECKELS SUGAR COMPANY WOODLAND, CALIFORNIA

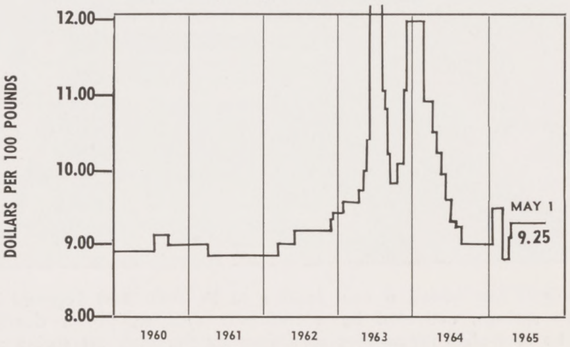
PRODUCTION AND DELIVERIES OF BEET SUGAR

Sales Year – August 1 to July 31



QUOTED PRICE OF BEET GRANULATED SUGAR

In 100 Lb. Paper Bags, F.O.B. San Francisco



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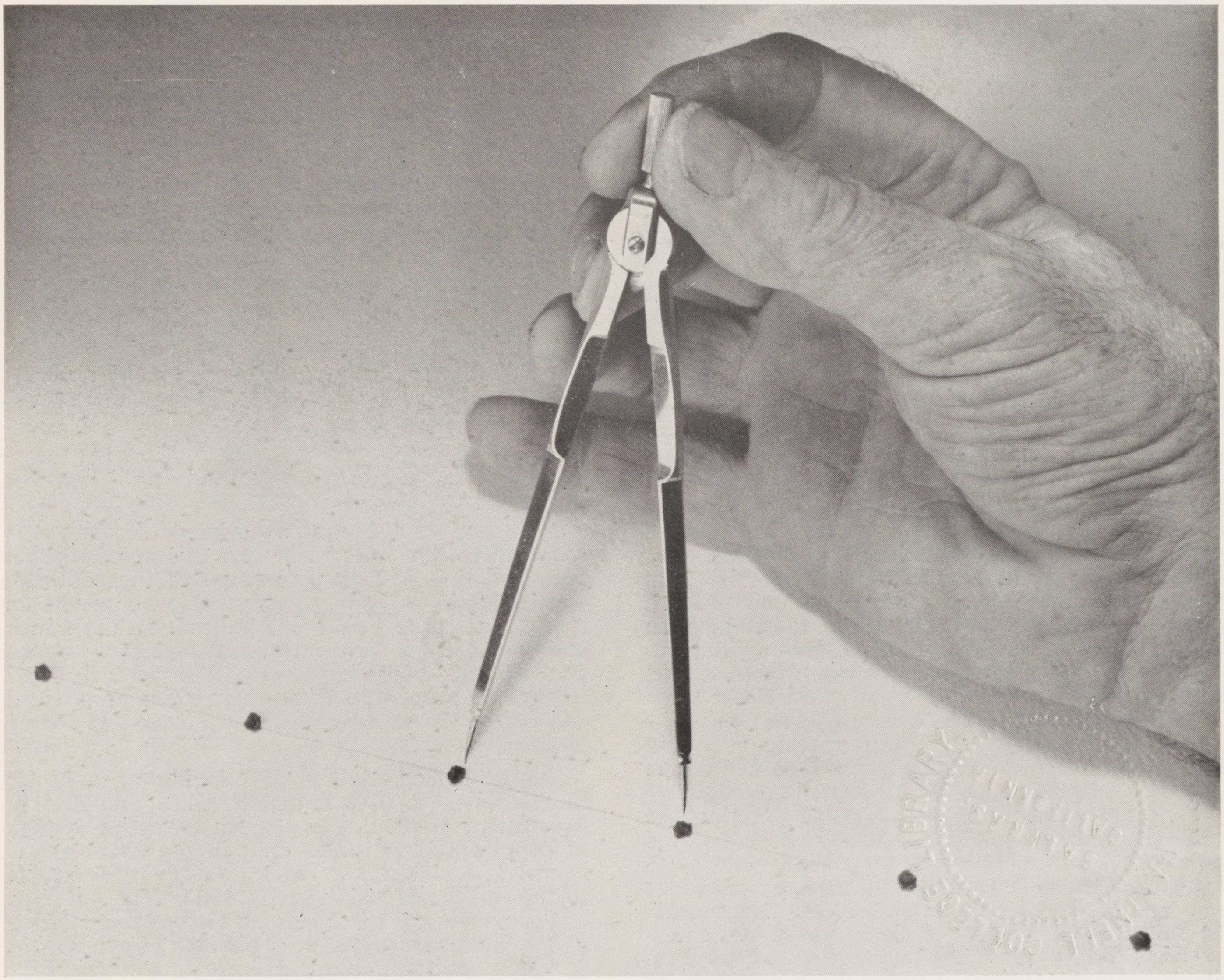
SPRECKELS SUGAR BEET BULLETIN

VOL. 29 NOVEMBER-DECEMBER, 1965 NO. 6



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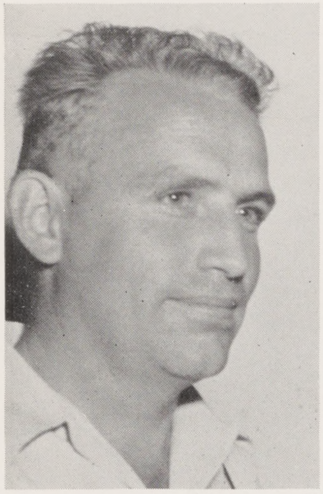
PRECISE SEED SPACING

is a prime requirement in a program of mechanized sugar beet growing. Seed spacings to meet a wide range of field conditions are discussed in this issue.

SOME STUDIES ON PLANTING TO A STAND

By DAVID RIRIE
Farm Advisor, Monterey County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PLANTING SUGAR BEETS to a stand has become a reality on several farms in Monterey County during the past two years. Because of the experimental attitude of several growers, it now seems feasible to extend planting to a stand to more acreages in the county. Herb Myer and Dick Lindsey of Gonzales, and Dean and John Pryor of Salinas have cooperated extensively with the University of California and Spreckels Sugar Company in experimental and commercial plantings to compare planting to a stand and mechanical thinning with standard procedures.

Earlier work by the University, which was done at Davis, had indicated that provided the spacing was uniform between plants, the yields were comparable from stands varying from 4 inches between plants to 16 inches between plants. It must be emphasized, however, that these experiments were done with exactness as to the distance between plants. To use the average number of plants for a given length of row to determine if the stand falls within the above limits could be misleading and disappointing. The 4 to 16 inch tolerance will not hold if many doubles or bunches occur at the closer spacings or appreciable skips over 16 inches occur at any of the spacings. Uniform spacing of closer stands requires a precision planter that will single the seeds ad place them at the desired spacing.

It was theorized that for a spaced planting the seeds should be dropped at or slightly closer than the minimum 4 inches between plants. Since some seedlings would not be expected to survive, an excess was planted to offset the expected loss. Consequently, in the experiments to be reported an International Harvester Co. Planter was adjusted to plant at 3 inches between seeds. This spacing was compared to plantings by the same planter at 8 seeds per foot, or 1½ inches between seeds, in two of the experiments. Two other experiments were planted at 3 inches between seeds and comparisons made between thinned and unthinned stands. All plantings were sprinkled to aid emergence and were also benefited by rains. All plantings were on double row beds in commercial fields and, except for experiment 4, each plot was as long as the commercial rows.

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HERB MEYER (L) of Herold Farms, Gonzales, participated in the experiments. Harold Voth (R) holds a beet from one of the 100% mechanical plots.

EFFECT ON YIELD

The yields of beets were generally reduced in the unthinned and machine thinned plots. The fact that the yield differences were not large and that potential labor savings were appreciable should, however, tend to cancel out the losses involved. Under field practices the comparative improvement of the unthinned plots from plot 1 done in 1964 to the next three experiments done in 1965 was encouraging. Further improvement might be expected to occur as the practice is developed. The yield results are summarized in Table 1.

Table 1. Tons of Sugar Beets Produced Under Different Planting and Thinning Practices.

Seeding Rate in Seeds/Foot	Type of Thinning	Yield, Tons Per Acre Exp. 1	Exp. 2	Exp. 3	Exp. 4
8	Hand	33.8			24.0
8	Machine	29.2			23.0
8	Machine - Hand Trimmed	31.7			25.1
4	Hand		27.6	29.0	
4	Unthinned	29.0	25.9	26.2	23.4
4	Hand Trimmed at Weeding Time				25.0

Note that in the first experiment the loss was considerable when the beets were unthinned. Counts indicated that a high percentage of the seedlings were closer to each adjacent plant than the minimum 3 to 4 inch spacing that was desired. In the 4 inch sections counted, 41% contained doubles or multiples, and this obviously lowered the yield. In other words, the *spaced planting appeared to result in a reduced yield because of too many beets and a poor planter pattern.*

The 1965 plantings had 27% doubles or multiples in experiment 2, 23% in experiment 3, and 22% in experiment 4. This was a much lower percentage of doubles and multiples than in the first experiment. The yield, as a result, was more favorable to the unthinned plantings in 1965. The per cent of the row in gap space may also have been a factor in the yield reductions observed, but in experiment 4, which had the greatest gap space, no significant yield reduction occurred. The stand relations are given in Table 2.

Table 2. Stand Counts—Unthinned Plots of Planting Experiments Compared to Post Thinning Counts of Hand Thinned Plots.

Exper.	Seeds/ Foot	Treatment	Hills per 100 Foot of Row	% Sing.	% Doub.	% Multi.	% of Row in Gaps over 16"
1	8	Hand Thinned	Not Recorded				1.0
1	4	Unthinned	170	59	29	12	5.0
2	4	Hand Thinned	167	94	6	0	2.0
2	4	Unthinned	164	73	23	4	3.0
3	4	Hand Thinned	150	97	3	0	1.8
3	4	Unthinned	176	77	20	3	2.6
4	8	Hand Thinned	141	93	7	0	3.9
4	4	Unthinned	162	78	19	3	10.1

EFFECT ON LABOR REQUIRED

The importance of weed control to the success of this practice can be illustrated by Table 3, below, showing man hours per acre required to do the necessary weeding and thinning for the crop.

Table 3. Man Hours of Labor Required for Planting Trials.

Seeds Planted		Man Hours			
Per Foot	Operations Performed	Exp. 1	Exp. 2	Exp. 3	Exp.4
8	Hand thinning and weeding	31.2			20.2
8	Machine thinning, hand weeding	17.1			14.8
8	Machine thinning, hand weeding, trimming out extra beets	22.1			17.6
4	No thinning, hand weeding	27.2	9.1	0.0	22.7
4	Hand thinning and weeding		16.1	16.3	
4	Hand trimming extra beets out & weeding				20.6

All of the plots received applications of herbicides with good control in experiments 2 and 3, incomplete weed control (some weeds survived) in experiment 1, and poor weed control in experiment 4. From this can come but one conclusion: *with weed control labor savings are possible and significant, but unless weed control is good, planting to a stand will be of no benefit in saving labor.* In fact, poor weed control may result in higher labor requirements where wider spaced plantings are made.

OTHER EFFECTS

Sucrose was not significantly affected by the stand planted or the method of thinning. The percentage of clean beets had a tendency to be higher where beets were thinned, but the difference was not large.

CONCLUSIONS

Planting beets at 3 inches apart gave satisfactory yields, but lack of precision of the drop pattern resulted in double and multiple beets that lowered yields. A basic 4 inch spacing would probably be better. Consideration of the planter is most essential. It should have a precise and single seed separation and maintain the desired uniform distance between seeds.

Weed control is a must. If it is not good, labor savings cannot be anticipated.

Where machine thinning was used the weeding labor was less than for hand thinned plantings. If good weed control is not possible, machine thinning should be considered, but if weed control is possible planting to a stand would appear to save more labor. Yields were comparable between thinning by machine and planting to a stand.

The prospects for successfully planting to a stand on a wider scale are good. In fact, one of our cooperators has already seeded a part of his next crop at 4 inches between seeds and will probably do no thinning and a minimum of hand weeding.

Acknowledgment:

Grateful appreciation is extended to George W. Wheatley and other staff members of Spreckels Sugar Company who assisted with the harvest of these plots, and to F. J. Hills who assisted in the planning of the experiments.

MECHANICAL THINNING TRENDS ESTABLISHED DURING 1965

By AUSTIN ARMER
Agricultural Engineer
Spreckels Sugar Company

THE REPLACEMENT of hand thinning by mechanical thinning in California is a trend which was greatly accelerated in 1965. Because mechanical thinning was so widely adopted, the opportunity arose to examine the technique employed in various parts of the state, and under various field conditions.

SEEDBED PREPARATION

Almost all sugar beet acreage in California is planted on beds — either double rows on 40 inch beds, or single rows on 30 inch beds (give or take an inch or two). Exceptions are found in the peat soils, where subbing or sprinkling is used for irrigation.

Wide or narrow, the beds are first formed by listing, and brought to final dimensions and soil condition by a bed shaper. The bed shaper is an important tool, and is almost universally mounted on some form of sled tool carrier. As of 1965 bed shaping generally includes chemical weed killers, mechanically incorporated by some type of rotary tiller. Immediately thereafter, the best seed is planted, generally by planter units mounted on the sled tool carrier along with the bed shaper and incorporator.

PLANTING

No single step in a spring mechanization program is so vital to success as is planting, yet no rigid rules can be set down because local soil, climate, and date of planting are governing factors.

In early planting areas, such as Imperial Valley, Salinas Valley and southern San Joaquin Valley, it is possible use a wide seed spacing (2 to 4 inches), since there is little probability of pre- or post-emergence loss of stand.

In the northern San Joaquin and Sacramento Valleys, (except the Delta), late planting is the rule. Late-planted beets are more subject to pre-emergence damping-off, to post-emergence insect damage, and weed competition. Consequently, a closer seed spacing (1¼ to 2½ inches) is desirable to insure an adequate pre-thinning stand.

It should be noted that any planter capable of reasonably precise seed distribution will produce a stand free of clumps or double beets IF the spacing is large. For example, suppose a certain planter can place a monogerm seed within plus or minus 1 inch of the position for exactly uniform spacing. Then let us see what happens for two extremes of planting rate—12 seeds per foot and 3 seeds per foot. The following tabulation shows what can happen:

RATE (Seeds/foot)	IDEAL SPACING	IDEAL SPACING Plus 1 inch	IDEAL SPACING Minus 1 inch	% Error
12	1.0″	2.0″	0.0″	±100%
3	4.0″	5.0″	3.0″	± 25%

This means that where a 1 inch spacing is attempted, there is the possibility that half the seeds

Continued on Page 51

4-H CLUBS WIN SUGAR BEET HONORS

OVER 200 4-H CLUB members participated in the 1965 sugar beet project in the counties where beets are grown for Spreckels Sugar Company.

The 4-H sugar beet project involves more than just growing a few sugar beets. During the course of the project, the boys and girls participating run fertilizer tests, date of planting trials and introduce other variables into their sugar beet plots which affect their yield or sugar content.

As the crop grew, the youngsters conducted their various agricultural experiments, receiving instructions when needed from their farm advisors and Spreckels' agricultural specialists on sugar beets.

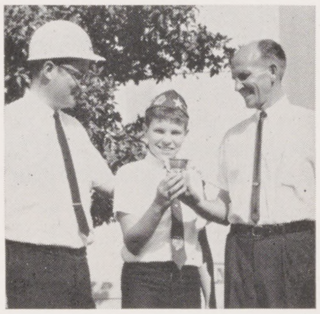
In October and November, the crops were harvested, yields were carefully recorded, and laboratory samples were taken to determine the average sugar content of each crop.

The beets were then processed at the four Spreckels Sugar factories, and an equivalent amount of sugar was returned to each participant during five Sugar Beet Field Day programs.

In addition to the processed sugar, each participant received a certificate of completion for the 4-H project, and top producers from each club received silver sugar bowl awards. The names of the 1965 participants are here listed, and we sincerely hope that no names have been omitted from this impressive list.

95

Al Boyden (Manager, Factory 2) and S. S. Anderson (Dist. 2 Manager) present to 4-H beet growers the sugar refined from the beets they produced. Receiving their sugar are Joann Gribaudo, Martin Franco, Doris Date and Don Rajewich.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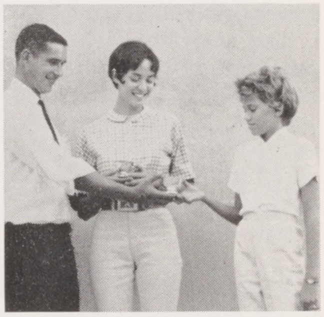
Russell Ross, top sugar producer in Stanislaus County, receives his trophy.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STAN BAYER presents silver sugar bowls to Patricia Ramos (for Kings County winner Raymond Stripling), and to Kathy Garlock Tulare County bowl winner.

DISTRICT 1

MONTEREY COUNTY

- Ashworth, David
- Cotta, Beverly
- Davis, Ted
- Kearney, Tim
- McKinsey, Leland
- Miller, Lynn
- Morisoli, Kathy
- Panziera, Allan
- Panziera, Ronnie
- Piffero, Margaret
- Piffero, Steve
- Schoch, Rose Marie

SAN BENITO COUNTY

- Jacinto, George
- Johnson, Sharon
- Medeiros, David
- Rebeira, Albert
- Rey, Michael
- Swett, Gregory
- Williams, David

DISTRICT 2

MERCED COUNTY

- Borelli, Eddie
- Borelli, Mary Rose
- Brenton, Daniel
- Cirscioli, Peter
- Clark, Kathy
- Clemens, Brad
- Date, Doris
- De Salles, Derle
- Doucette, Pat
- Lemberger, Lois
- Lutz, Randy
- Mitchell, Judy
- Motts, Kathy
- Motts, Molinda
- Sewart, Cris
- Tell, Robert
- Trautman, Debby

SAN JOAQUIN COUNTY

- Coil, Chuck
- Franko, George
- Franko, Martin
- Johnson, Doug
- Mitchell, Gary
- Mullins, Ed
- Mullins, Richard
- Peets, Kevin
- Peets, Robin
- Podesta, Sally
- Robertson, Glen
- Robusin, Frank
- Schreiner, Rickey
- Sousa, Arnold
- Stagnero, Chris
- Stagnero, Jim
- Stevens, Jim
- Trimbel, Steve
- Tucker, Richard
- Valenti, Gary
- Vincelet, Dennis
- Vincelet, Ed
- Vincelet, Fred

STANISLAUS COUNTY

- Beltran, Fred
- Bettencourt, Jackie
- Bowers, Dennis
- Brommer, Mike
- Crow, Norman
- McCloud, Evelyn
- Rajewich, Donald
- Ross, Linda
- Ross, Russell
- Ulm, David
- Van Dohlen, Ed
- Van Dohlen, Fred
- Willson, Jamie
- Willson, Susan

DISTRICT 3

COLUSA COUNTY

- McCullough, Steven
- Mumma, Ken
- Rominger, Jerry
- Shields, Keven
- West, Brad

SOLANO COUNTY

- Bergstrom, Karen
- Bergstrom, Kay
- Bergstrom, Keith
- Esperance, John
- Glashoff, Larry
- Glashoff, Philip
- Gollinger, Stanley
- Jones, Linda
- Lang, Jeff
- Lang, Vickie
- Nishikawa, David
- Robben, Tony
- Sequeira, Richard
- Slater, Ron
- Vassar, David

YOLO COUNTY

- Bryant, Ken
- Cramer, Jack
- Ellis, Mark
- Jackson, Jim
- Keaton, Russell
- Kerr, Eugene
- McAravy, Jeff
- Scott, Gary
- Timothy, Kim
- Woltmon, Dale
- Woltmon, Gary

DISTRICT 4

MADERA COUNTY

- Barnett, George
- Calson, Mark
- Longatti, Kathy
- Payne, Jerry
- Payne, Virgil
- Richina, Sandra
- Richina, Shelly
- Richina, Sherry

FRESNO COUNTY

- Airless, Tom
- Becker, Maurine
- Buchnoff, Morrie
- Chaney, Tom
- Fairless, Paul
- Gracis, Leonard
- Garrison, Nancy
- Hayden, Layne
- Helmuth, Rick
- Jones, Robert
- Kandarian, Sharon
- Miyamota, Sharon
- Miramota, Susan
- Quinn, Duane
- Sanchez, David
- Santos, Kathy
- Santos, Tony
- Sentee, Dewitt
- Sentee, Paul
- Stine, Tom
- Whitten, Juan

KINGS COUNTY

- Beberia, Larry
- Bellocchi, Sandra
- Cardoza, Stanley
- Crawshaw, Barbara
- Crawshaw, Norman
- Dooley, Dan
- Dutra, Dan
- Dutra, Jim
- Dutra, Sharon
- Dutra, Tim
- Esajian, Eddie
- Farley, Kirk
- Hart, David
- Kemble, Dennis
- Luiz, Kenneth
- Luiz, Larry
- Ramirez, Joe
- Ramos, Beverly
- Ramos, Patty
- Ramos, Linda
- Reed, Michael
- Shirley, Tom
- Snell, Gary
- Stripling, Raymond
- Watkins, Donnie
- Westfall, Larry

TULARE COUNTY

- Adams, Mike
- Asay, Bill
- Carlock, Kathy
- Carter, David
- Cisneros, Eddie
- Clark, Ronnie
- Conrad, David
- Conrad, Matthew
- Crawford, Jim
- Crawford, Paul
- Curti, Kenny
- Encinas, Jesse
- Encinas, Mary Ann
- Garlock, Larry
- Guiley, Stephen
- Liebau, Scott
- Luiz, Michael
- Luiz, Steven
- Marquez, Donald
- Marquez, Douglas
- Marquez, Richard
- Martin, Jerry
- Martin, Joe
- Martin, John
- Martin, Louis
- Mays, Ethel
- Miner, Shirley
- Miner, Wayne
- Naylor, Fred
- Naylor, Mike
- Owens, Rick
- Parsons, Jim
- Parsons, John
- Pedroncelli, Alyn
- Pedroncelli, Larry
- Saylor, Jerry
- Saylor, Ken
- Simmons, Dale
- Simmons, Jan
- Strohmaier, Phillip
- Swall, Pam
- Todd, Gary
- Vieira, Alvin
- Weisenberger, Gary
- Whitendale, David
- Whitendale, William
- Wiebe, Waldo
- Williams, Steve

SLEDS -- BASIC TO SPRING MECHANIZATION

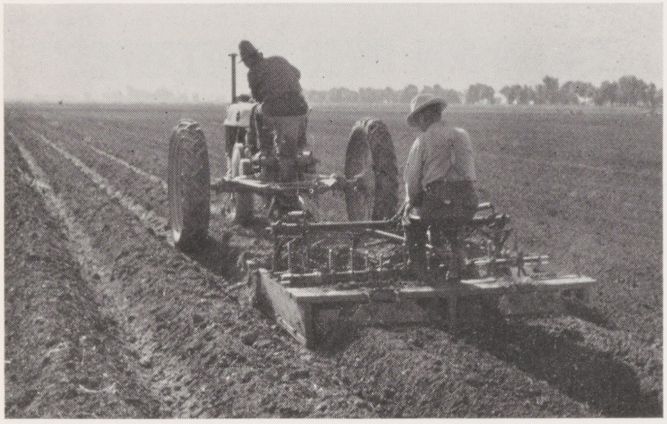
1965 WILL GO DOWN in history as the year of transition from hand labor to mechanization in doing the various springtime operations for row crops in general and sugar beets in particular.

The basic tool which stars in this dramatic revolution is the sled tool carrier. No stranger to the California beet grower, the sled was used 4 decades ago as a horse-drawn planter carrier in the Salinas Valley vegetable and sugar beet fields.

Beginning in 1949, several Woodland growers for Spreckels Sugar Company built "planting combines" — sleds which carried listers, bed shapers, rotary tillers, fertilizer applicators and planters. In 1957, K. C. Welding Works of El Centro introduced the sled tool carrier, which enabled cultivating tools to accurately follow the seedling rows previously planted by the same sled.

The rest is history — in 1965 every maker of row crop tools, from the crossroads blacksmith to the long-line implement manufacturer, offers a sled tool carrier which can form beds, incorporate herbicides or fertilizer, plant the seeds, cultivate the weeds and thin the crop to a final stand.

Two of the pioneers and three of the sophisticated 1965 models are illustrated herewith.



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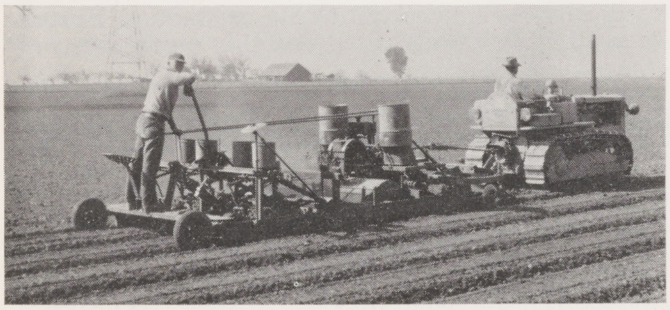
In 1944 Austin Armer, Spreckels Agricultural Engineer, combined a P&O horse-drawn cultivator with a Salinas Valley vegetable-planting sled in order to introduce 2-row bed planting into the Sacramento Valley.



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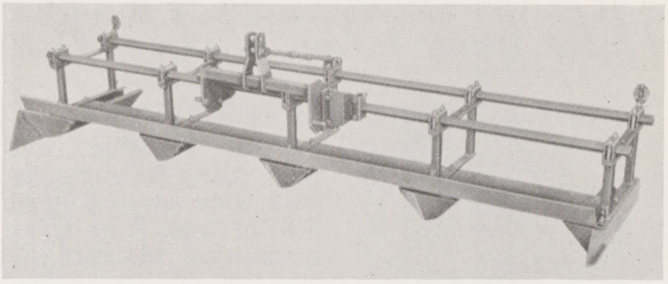
In 1949, Tadlock & Orrick, Woodland beet growers, built this combine sled for listing, bed shaping, fertilizing and planting sugar beets.



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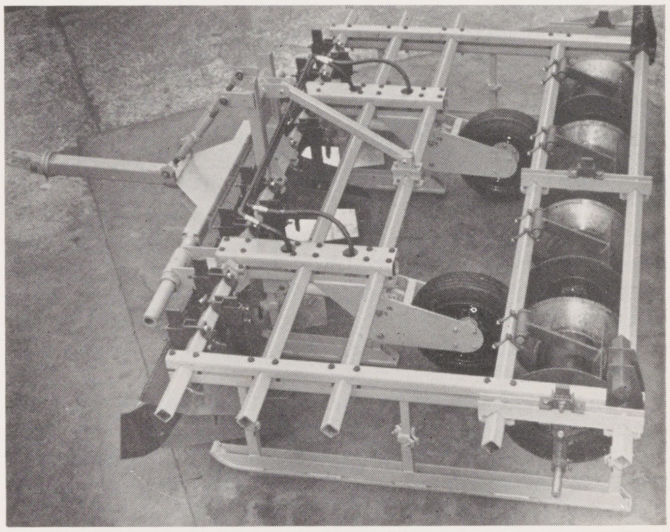
THE JOHN DEERE SKM sled carrier (for 3-point hitch) accommodates all planting, cultivating or thinning tools, including their new 71 Flexiplanter.



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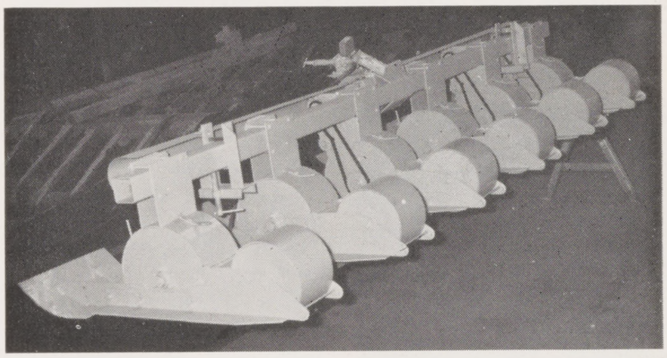
WESTERN BYE-HOE, INC. offers the "Bedmaster" sled. Drawbar model shown above; 3-point hitch model also available.



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MARVIN LANDPLANE COMPANY has a new weedicide incorporator (above), which is quickly attachable to their "Rowmaster" bed shaper (right).

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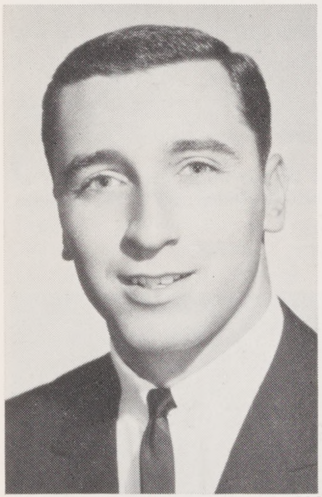
Notes from Our Field Men

NORMAN F. RIANDA — MANTECA



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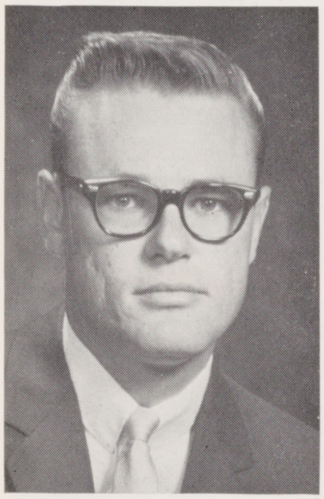
With thinning well past, many farmers feel they were saved a great deal of trouble by using mechanical blockers instead of the high priced labor available today.

Whether they used a Crop Master, Blackwelder, Eversman, Silver or just disc blades, they got their beets thinned, and on the whole are happy with the job. The majority of blockers used were either Crop Masters or notched disc blades. The Crop Master has an infinite range of adjustments and can be made to work on any stand if the grower will take the time and fiddle with it until it does the job. The disc blades, on the other hand, seem to work best where the stand is thin. There is not much adjustment on these, but they also will do the thinning job.

One grower stated he saved $20 or more per acre by mechanically thinning his beets and he still has the machine to use next year. Another quipped that the best part about mechanically thinning his beets was that the machine "did not talk back for more money like the crews of today are in the habit of doing."

Whatever was used this year in the line of equipment to thin beets, the grower seems happy with the job done and is confident he will have more money left over at the end of the year from mechanization.

NORMAN D. SHELTON, WOODLAND



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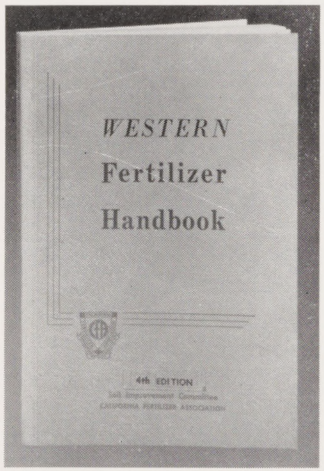
For the week ending May 15 there were approximately 1300 acres planted in my district, and I expect almost half-again this much this coming week. In most cases I have stopped recommending the 1½ inches or more between seeds, and have gone instead to 1.25 inches or less depending on the condition of the seed bed, relative amount of weeds expected and the type of thinning expected. If mechanical thinning is planned the type of thinner the grower owns might determine a different rate. I say this because of information obtained a few weeks ago by Jack Brickey in a thinning trial in which different thinners were used on different seeding rates. The Crop Master (from Arizona) and the new type of Speedy (the wheel lays horizontally) worked best at the 1 inch spacing, while the Blackwelder gave the best results on the 2 inch rate. The Silver gave the best performance at the 3 and 4 inch spacings.

NEW FERTILIZER HANDBOOK ISSUED



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THE WESTERN FERTILIZER HANDBOOK now appears in its 4th edition. This will be good news to all who are concerned with plant nutrition, including, of course, sugar beet growers.

The previous edition (20,000 copies) was completely sold out. So it is fortunate that this useful manual is again available at $2.00 a copy from the California Fertilizer Association, 719 K St., Sacramento.

CALIFORNIA WEED CONFERENCE

The 18th Annual California Weed Conference is scheduled to be held in San Jose, California on January 18, 19 and 20, 1966 with headquarters at the Sainte Claire Hotel. In view of recent labor supply problems in California and other western state, mechanized trends, including new developments related to weed control by the aircraft industry, will be a major topic of discussion at this meeting. Other subjects to be included on the program will be research reports by Industry, University and Extension Service spokesmen; regulatory problems, both Federal and local; industrial weed control; and to accommodate San Francisco Bay Area nurserymen and landscape architects, a panel will cover weed control on ornamentals and groundcovers.

Because sugar beet growers depend so heavily on weed control for successful crop production, Spreckels growers are urged to attend this conference.

FARM MACHINERY CONFERENCE, DAVIS

Registration at the 35th Annual Farm Machinery Conference will start at 1:00 P.M., January 27, 1966. The program will terminate after an all-day session, January 28 (Friday).

Meeting place, as usual, will be room 798, Physical Sciences Building on the U. C. Davis Campus (better known as "Chem. Aud.").

MECHANICAL THINNING TRENDS

Continued from Page 47

planted will produce double plants. On the other hand, with a nominal spacing of 4 inches, the range of seedling spacings is from 3 to 5 inches — and should some pairs of plants mature 3 inches apart, two good beets will result.

This comparison becomes even more pronounced if two seeds fill a single planter cell. Then the double (for 1″ spacing) becomes a clump of 3 or 4 seedlings, yet the worst that can happen with the 4 inch spacing is two pairs of doubles, 3 inches apart.

THINNING? BLOCKING? BOTH?

If every seed in a 4 inch spacing produced a seedling, a perfect stand (8 inch spacing) could be achieved if every other plant were removed. That is exactly what a blocker will do if it makes a 4 inch cut every 8 inches down the row. While such a condition is theoretically possible, it is pretty improbable. Therefore practical blockers make a cut which is variable from around 2 to 4 inches, every 5 to 7 inches or so.

Now take an example from the opposite extreme; a 1¼ inch seed spacing (with some double cell fill), which germinated and emerged nearly 100%. Here we have a solid green band of seedlings, and no matter how we set up a blocker, every block which remains will contain double or multiple plants. Now we are obliged to use some sort of random thinning machine — either a cross-the-row tine harrow or a down-the-row tine wheel thinner-weeder.

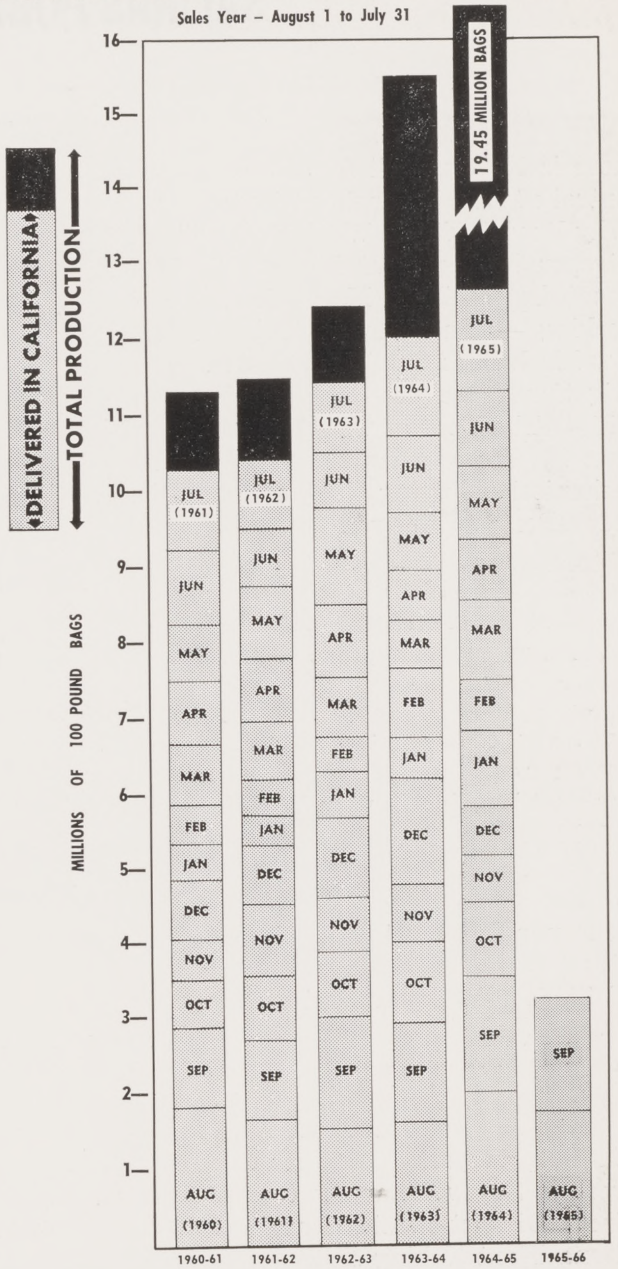
The latter situation has some advantages. While the average spacing between beet seedlings is increased, the clumps and doubles are also reduced *and* weeds are removed from the row. Furthermore, if one pass fails to remove enough clumps, doubles and weeds to leave a desirable final stand, a second, third or even fourth pass can be made. The principal obstacle to complete success in using the thinner-weeder alone is that it will not work unless the soil is quite soft or sandy.

It becomes apparent that every case is a special case, and that no generalities can be drawn as to what machine to use where. However, in spite of this hedging statement, and in order to present information of even partial value, the following tabulation is submitted:

STAND	SOIL	MACHINE
Heavy, many clumps	Soft, sandy	Thinner-Weeder (2 to 4 times over)
Heavy, many clumps	Hard	Blocker—narrow cut (twice over)
Medium, some clumps	Soft, sandy	Thinner-Weeder (once) +Blocker—medium cut
Medium, some clumps	Hard	Blocker—wide cut (once over)
Light, uniform	Soft, sandy of hard	Blocker—medium cut (once over)

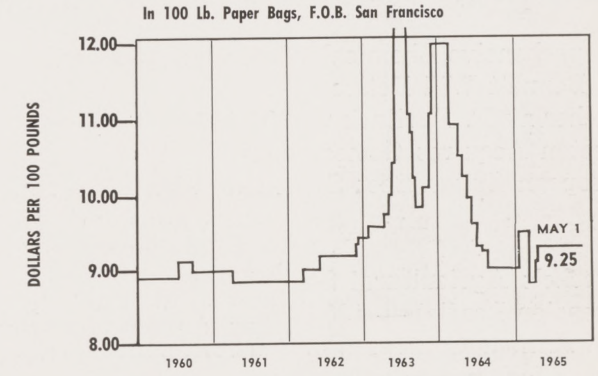
SPRECKELS SUGAR BEET BULLETIN is issued bi-monthly by the Agricultural Department of Spreckels Sugar Company as a service to its growers. Mention of specific methods, devices and implements does not constitute an endorsement by the Company.
AUSTIN ARMER, EDITOR
SPRECKELS SUGAR COMPANY WOODLAND, CALIFORNIA

PRODUCTION AND DELIVERIES OF BEET SUGAR



Sales Year – August 1 to July 31

QUOTED PRICE OF BEET GRANULATED SUGAR



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